THE RUBBER AGE

ESTABLISHED 1917

COVERS ALL PHASES OF THE PRODUCTION AND MARKETING OF CRUDE RUBBER AND THE MANUFACTURE AND DISTRIBUTION OF RUBBER GOODS

Vol. 36 JANUARY, 1935 No. 4

The CLASSIFIED COLUMNS in this issue contain a number of opportunities for those seeking employment, or a rubber factory, or rubber equipment, or a representative. Consult page 209, *now!*

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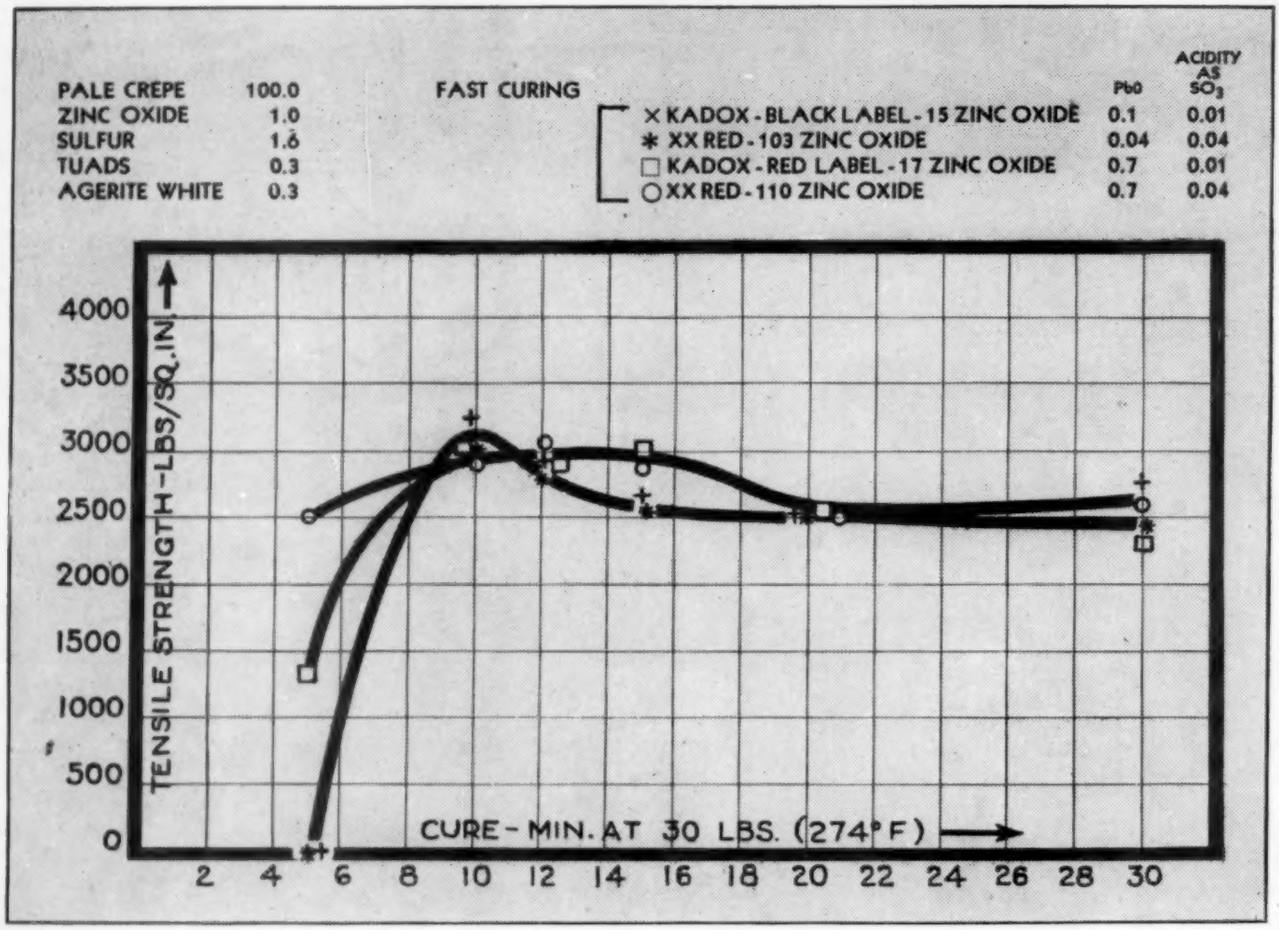
The Effect of Lead Content and Acidity of Zinc Oxide in a translucent compound accelerated with "Tuads"


PALE CREPE 100.0
ZINC OXIDE 1.0
SULFUR 1.6
TUADS 0.3
AGERITE WHITE 0.3
FAST CURING
PbO
ACIDITY AS SO_3
× KADOX - BLACK LABEL - 15 ZINC OXIDE 0.1 0.01
✱ XX RED - 103 ZINC OXIDE 0.04 0.04
□ KADOX - RED LABEL - 17 ZINC OXIDE 0.7 0.01
○ XX RED - 110 ZINC OXIDE 0.7 0.04
TENSILE STRENGTH - LBS/SQ. IN.
4000
3500
3000
2500
2000
1500
1000
500
0
CURE - MIN. AT 30 LBS. (274° F)
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30

The "lead-free" brands, Kadox Black Label-15 and XX Red-103, show no cures in 5 minutes at 274° F. and give sharp peak curing curves. The brands containing lead (Kadox Red Label-17 and XX Red-110) are faster curing and tend to give flatter-curing curves.

NOTE In higher Zinc Oxide compounds thiuram disulphide cures are definitely retarded by PbO.

New Jersey Zinc

No. 34 of a series of charts showing a comparison of "FAST" and "SLOW" curing zinc oxides with typical accelerators.

THE NEW JERSEY ZINC COMPANY 160 FRONT STREET NEW YORK

THE RUBBER AGE

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Application of Electronic Devices In the Rubber Industry

By L. R. Harness
Westinghouse Electric & Manufacturing Company

ELECTRONIC devices have been found to be the only practical solution to many problems encountered in the manufacture of rubber, its lack of strength in early processing and its elasticity in later processing, necessitates the use of devices capable of accomplishing functions beyond the capabilities of the more conventional mechanical and electrical devices. Because of the wide diversity of methods by which electronic devices may be employed to initiate operations, their use in unusual applications is becoming more and more extensive.

One of the simplest applications of electronic equipment is counting objects on moving conveyors, in production lines, or in any location where it is undesirable or impossible to apply a counter operated by means of a mechanical arrangement.

All that is required is a light source such as is shown in Figure 1-a, a photo-electric control device such as the Photo-Troller in 1-b, and a housing for the phototube as shown in 1-c. The light source and phototube housings are mounted so that objects to be counted will pass between them and intercept the light beam directed upon the phototube in its housing. They are then connected to terminals provided in the Photo-Troller which is, in turn, connected to the source of power and to a magnetic counter which can be readily operated by the Photo-Troller relay contacts.

Small or light objects or materials having a fine finish cannot be used to operate a lever to close a pair of contacts and heavy, bulky objects may be just as difficult to count. A beam of light, however, can be intercepted by an object 1/8" in diameter or even smaller, will not mar the finest finish, and cannot be damaged by heavy objects. For small objects, a concentrated beam of light must be used and the light source placed close to the ob-

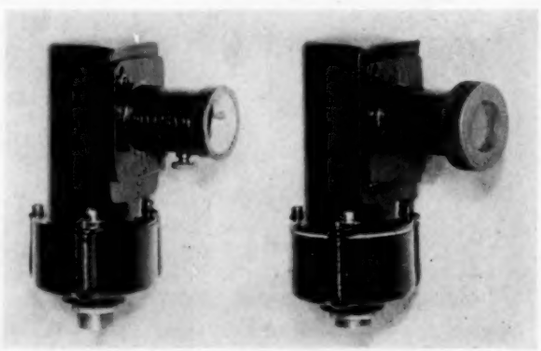


FIG. 1-A (left)—A conventional type of light source, which receives its power directly from the Photo-Troller. It can be mounted in inaccessible places. FIG. 1-C (right)—The housing in which the Phototube may be mounted.

ject, unless a long-range parallel beam of light can be obtained. For larger objects, however, where a larger beam may be used, the light source may be placed several feet from the object, often a very desirable thing to do, and one which cannot be done with mechanical counters

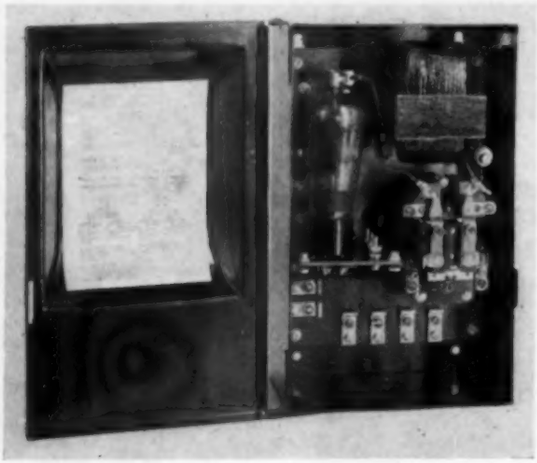


FIG. 1-B—The simple A.C. type of Photo-Troller suitable for general purpose applications.

when a physical contact with the counted object must be obtained. Such counting systems may be used to count tire carcasses, finished tires or tubes, rubber toys, boxes of rubber products ready for shipment or other rubber products which move along a prescribed path.

The same equipment which is used for counting may be used for a multitude of relaying and control operations. It can control the lubricating spray for tire carcasses before they go to the mold, start and stop conveyor systems, open and close doors automatically and do a thousand similar jobs. When an operation of a more complex nature is required time delay or sequence switching systems can be employed to advantage with the electronic equipment supplying the initiating impulse.

Just how does such a device operate? Can its operation be explained without going into involved and deep theory? Certainly. The source of light is simple enough. It consists of a lamp with a lens in front of it to collect a portion of the light and concentrate it so that a parallel beam may be projected which will reach its destination with greater intensity.

This destination is the active surface of a phototube such as is shown in Figure 2-a, a device which has the unusual property of changing its resistance to the flow of current under the influence of light. This characteristic is shown graphically in Figure 3. The more intense the beam of light, the less is the resistance offered by the phototube. Thus, when the object to be counted intercepts the beam of light, the phototube assumes a resistance of almost infinite value whereas it may have had a resistance of only 5 megohms (5 millions of ohms) when the light was shining on it. Assuming a voltage of 50 volts across the phototube, we see that the current has changed from 10 microamperes (10 millionth of an ampere) to zero. While this current change may be enough to operate extremely delicate types of relays, it is unfortunately not great enough to operate any available relay suitable for general industrial applications. Therefore, something must be done to increase the energy available to a point where it can be used to perform a useful function.

The circuit in Figure 4 shows how this can be done. Here a phototube is so connected in the circuit that it shifts the phase of the voltage which controls the grid-glow tube shown in Figure 2-b. This type of tube is capable of passing currents of several amperes and at the same time it can be controlled by the feeble power output of a phototube. The grid-glow tube, therefore, very capably takes the place of any mechanical relay to amplify the output of the phototube to a conveniently usable quantity of power which can be utilized to operate solenoids, contactors or other devices, according to the requirements of the application. With the phototube illuminated, the anode voltage on the grid-glow tube and the grid voltage are exactly 180 degrees out of phase as shown in Figure 5-a and the grid voltage is of sufficient magnitude to prevent the passage of current in the anode circuit.

In other words, there is no passage of current through the grid-flow tube to operate the Photo-Troller relay. Then, when the phototube is darkened, the grid voltage is positive at the beginning of the cycle of anode voltage, Figure 5-b, and the tube conducts current throughout the positive half-cycle. It must be borne in mind that once current starts to flow in the anode circuit of grid-glow tubes, the value of the grid voltage has almost no effect upon the flow of current and consequently the anode current can be stopped only by interrupting the circuit externally or, in the case of a.c., with the zero value of anode current or voltage.

Thus it is seen that the anode current will flow throughout the full half-cycle if it is permitted to start at the beginning of the half-cycle. This characteristic is extremely important on d.c. circuits where the grid-glow tube may be tripped by a very brief impulse whereupon current will begin to flow and continue flowing until interrupted externally. This, of course, provides an extremely high speed lock-in relay, one which will operate on an impulse of .0001 of a second, something impossible with mechanical devices.

Automatic classification of raw materials on selective conveyor systems may be easily accomplished by coded

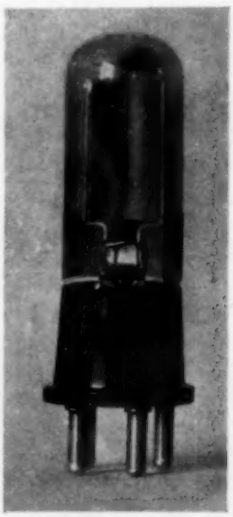


FIG. 2-A — This phototube is the heart of photo-electric control devices discussed here.

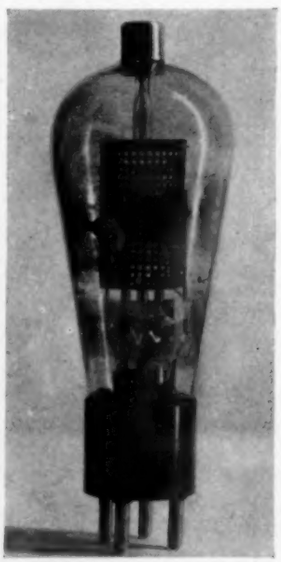


FIG. 2-B—The grid-glow tube acts as a power relay for the feeble current output of the phototube as described above.

NOTE: Illustrations do not represent relative sizes of tubes

flags mounted on the conveyor pans. The flags may be used to either intercept the light beam or to reflect it, the choice of which system to use being largely determined

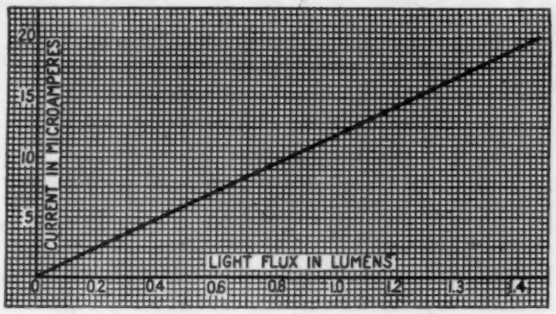


FIG. 3—Showing how the current in a vacuum type phototube varies with illumination with a constant voltage applied.

by the operating conditions of the particular application. An advantage of the intercepted light beam is that less sensitive and usually less expensive equipment is required. A disadvantage is that the light source must be mounted on one side of the conveyor and the phototube on the other, thus requiring greater mounting space and two mountings properly aligned. The advantages and disadvantages of the reflected light system are just the opposite of those of the intercepted light system, greater sensitivity being required since it is not possible to secure as great a change in illumination by reflection as by interception, although

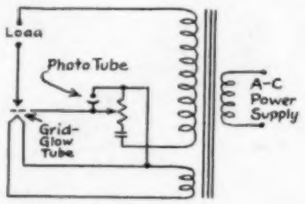


FIG. 4—Diagram showing a simple A.C. photo-electric controller circuit.

mounting is simplified since the light source and phototube may be assembled in a common unit properly adjusted with respect to each other. Such an assembly is commonly termed a "scanner."

For reflected light or other applications where greater sensitivity is required, a circuit as shown in Figure 6 may be used. Here an amplifier tube is used to increase the output of the phototube so that a smaller impulse from the phototube will still be amplified to sufficient magnitude to control the grid-glow tube. Another feature is included in this equipment also. This is the use of a rectifier tube to supply d.c. to the tube rather than a.c., as was supplied in Figure 2. As was previously mentioned, the grid-glow tube can be operated by an impulse as short as .0001 of a second. With d.c. applied to all tubes, as shown in Figure 6, it is possible to pick up such an impulse with the phototube, amplify it with the amplifier tube, and operate the grid-glow tube with it since rectified d.c. properly filtered does not have pulsations as does a.c. and, therefore, voltage is always available on the anodes of the tubes.

If a.c. were applied, the impulse might occur during the wrong half-cycle or during a point on the positive half-cycle where the voltage is low so that the tubes could not respond to the impulse.

Thus it is seen that for applications where the impulse is of brief duration, d.c. must be applied to the tubes. Figure 7 shows a controller of this type. The light source and phototube housing in Figure 1 may be used with it.

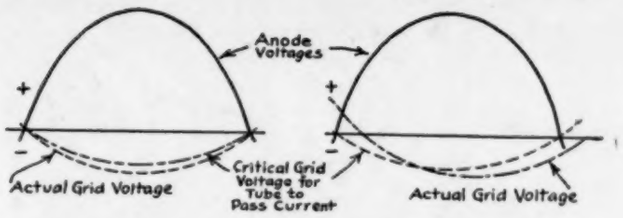


FIG. 5-A—(left)—Grid-glow tube anode and grid voltage relationship with no current flowing. FIG. 5-B—(right)—Anode and grid voltages after the phototube has shifted the former relationship. The tube is now conducting current.

For the majority of applications, however, there is generally enough time to operate an a.c. type equipment. The limitation in the speed of operation of a.c. equipment is generally in the mechanical relay rather than in the electronic equipment since the tubes respond to half-cycles while the usual relay will require at least a few cycles in which to close. The impulse is transmitted to the relay, but it does not have sufficient time to operate.

Each device may be considered as a relay having extreme sensitivity, speed or other characteristics as desired for a particular application. The phototube supplies a small change in current but this change may come from other sources just as well. Thus, all of these devices may be operated by a small change in current, voltage or resistance, or by a delicate pair of contacts.

Equipment of the type described above may be used to control such operations as pressing the valve patch on the tube, stamping the tube with the trademark and size, detecting wrinkles in webs or sheets as well as in the counting and conveyor control application.

This equipment is also especially well adapted to the control of cutting operations. Tubing may be cut to length in accordance with trademarks, soles of rubber shoes or boots may be accurately cut or trimmed, and similar operations controlled where the interception of a light beam, variation in reflection, or closing of a delicate pair of contacts are the sole source of the initiating impulse.

Matching of colors in fancy rubber goods is always a puzzling problem because of the inaccuracies of the human eye. The electronic color matcher removes all human errors, eliminates eye strain, and guarantees an accurate match. This device compares the reflection properties of materials in three colors, blue, green and red, the light being reflected back upon a phototube, the amplified current of which is read on an instrument. When two materials reflect the same amount of light in each color, as indicated by identical instrument readings, these materials are perfectly matched.

Transparency of materials may be read directly on an instrument called the "Trans-O-Meter." A light source

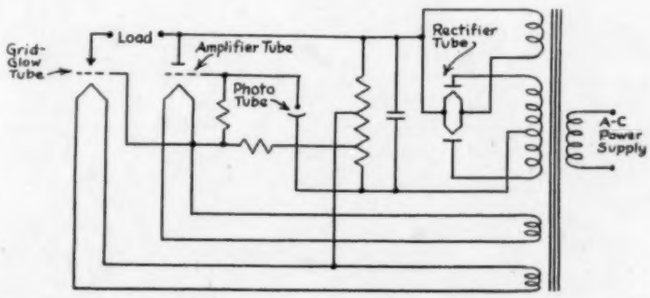


FIG. 6—A sensitive quick response photo-electric controller circuit with D.C. supplied to the phototube, amplifier tube and grid-glow tube by the rectifier tube.

supplied by a voltage regulator incorporated in the device projects light through the material upon a Photox, a photo-voltaic cell which generates an amount of current proportional to the illumination on it. This current is read on an instrument calibrated in percent transparency. To operate the Trans-O-Meter, which is portable, it is simply necessary to connect the device to a power supply, adjust the circuit so that the instrument reads 100% with no material between the light source and the Photox, and then insert the material. Naturally, the amount of light which passes through the material indicates its transparency.

Tread noise is becoming more and more subject to scrutiny as cars become smoother and quieter in operation, as speeds increase, and as greater attention is being paid to noise elimination. Electronic noise analyzers offer the ideal solution for finding the frequencies and amplitudes involved and definitely showing when improved designs have been made. The use of the stroboscope permits the study of the action of the tread while moving at high speeds as easily as if it were motionless. These two devices, therefore, comprise two invaluable instruments for studies of noise and of strains and stresses of recurrently moving objects.

While the wholesale application of electronic devices to every possible use in the rubber industry is not recommended, their application is always in order when conventional types of mechanical and electrical devices fail to operate satisfactorily or at all.

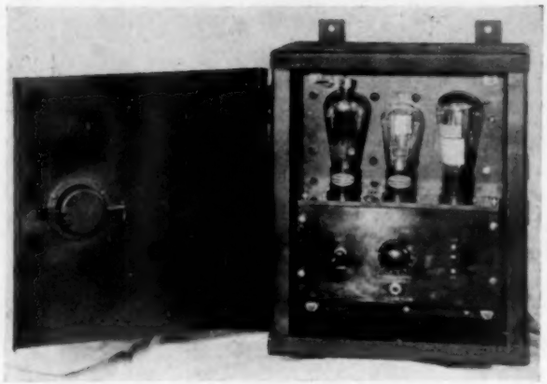


FIG. 7—The rectifier tube at the right supplies D.C. power to the grid-glow tube at the left, the amplifier in the center, and the phototube externally mounted to increase the sensitivity and speed of response of the device.

Aniline Inks and Rubber Stereos

ALTHOUGH the development of the aniline ink process is only about twelve years old, its use is increasing rapidly especially in the paper bag and wrapping paper fields. Ink manufacturers, in their research divisions, are constantly seeking further development. These pertinent points were made by T. A. F. Sexton during an address on "Printing with Aniline Inks and Rubber Stereos" at Stationers' Hall, London, on November 16.

Aniline inks contain a large content of methylated spirits. Because of this reason, among others, they do not work particularly well with metal stereos. Research in this connection reveals that rubber stereos are best suited for use with this ink. Rubber rollers are preferred to composition rollers because the latter contain a certain percentage of water and are impaired by prolonged action of methylated spirits which are used in the making of aniline inks. For best results it is recommended that rollers should be tightened as much as possible without distortion. The impression of the roller on the rubber stereo, and of the latter on the paper, should be the least possible.

Rubber stereo plates are made by subjecting the rubber mix to a pressure of about 1 ton to the square inch at the temperature obtained by steam at a pressure of 60 lbs./sq. inch. Vulcanizing takes about 10 minutes. According to the lecturer rubber containing large amounts of calcium carbonate and magnesium carbonate as filling materials are undesirable. Aniline inks sometimes incorporate acetic acid, especially when made by printers in their own plants. (There are solvents on the market that will dispense with the odorous, corrosive acetic acid if used). Because of the often-included acetic acid in this ink, which dissolves calcium carbonate and magnesium carbonate, their presence in the rubber as fillers is undesirable, as mentioned above. Rubber, of course, can easily be chemically tested to determine the presence of these undesirables.

Since large printers generally prefer to make their own rubber stereos several rubber companies (including the Pirelli and Greengate Rubber companies) are now supplying semi-raw rubber mixes. One English concern, Paramat Plates, Ltd., of London, has devised a special mold which has proven popular. A papier mache flong is made, backed with filling material, pressed and heated at 60 lbs./sq. inch pressure, in a specially constructed hydraulic press. Alternative molds are soft-lead alloy, or some form of quick setting cement.

The molded plate, according to Mr. Sexton, particularly if used for rotary work, has to be planed by actual cutting or grinding. For mounting the Paramat plates an adhesive plaster containing rubber is used. A piece is cut from a sheet sufficient to allow a half-inch margin all around the stereo. The plaster is moistened and made tacky with a rubber solvent, such as naphtha or petroleum spirit. Stereo and plaster are pressed together. The other side of the plaster is similarly rendered tacky and mounted on the cylinder of the rotary machine. There is considerably more make-ready necessary for rotary presses than for flat-bed printing.

The life of a rubber stereo is indefinite. Some have been known to give 2,000,000 impressions. Softer rubber mixes wear longest. Such mixes possess a high maximum of resilience and contain a higher percentage of rubber. The rubber "gives" before the gritty content of cheap paper, while unyielding metal plates usually suffer damage.

There are, naturally, some disadvantages in the use of rubber plates. For instance, rubber plates molded flat and later used for rotary work undergo distortion to such an extent that the changing of a circle into an oval often occurs. Rubber swells and deteriorates when in contact with oils and petroleum products, with the notable exception of castor oil. Vegetable oils are less deleterious. While improvements have been recorded in the search for a rubber mix that will successfully withstand oils no guarantee against the action of such oils has been given by any stereo manufacturer. Rubbers that resist the action of oils to an appreciable degree have been found too hard for suitable printing.

In concluding his address the speaker made several recommendations for the use of rubber stereos. Their use with varnish inks is not recommended. Results obtained with rubber stereos when molded to half-tone blocks are passable, but at present are not comparable with the printing obtained by metal printing plates. If the screen used is fairly coarse they may be employed satisfactorily and even with aniline ink spirits.

Industrial Dermatitis

A Treatise on the Causes, Diagnosis and Treatment of Dermatitis Including Several Preventive Measures

By P. A. Davis, A.B., M.A., M.D.

Assistant Medical Director, Goodyear Tire & Rubber Co.

THIS subject is somewhat misleading for one would suspect that it is some specific entity of the particular industry, such as rubber dermatitis, leather dermatitis, cement dermatitis and so forth. However, from the lay standpoint, this seems to be the foregone conclusion, but from the scientific standpoint it is not true and certain classifications should be made. For purposes of investigation and study the following 5 important factors must be considered.

1. What is the nature of the dermatitis and what is the part involved? The following classification by Sutton is of value:

a. Hyperemias
b. Inflammations
c. Hemorrhages
d. Hypertrophies
e. Atrophies
f. Anomalies of Pigmentation
g. Neuroses
h. New Growths
i. Disease of Appendages
j. Parasitic affections
k. Diseases of the Mucous Membranes adjoining the skin

2. What is the condition of the individual who has the dermatitis? About 3% of all persons are more or less susceptible to some kind of dermatitis and this susceptibility varies according to certain body factors.

a. Acidosis or Alkalosis of the system.
b. Endocrine disturbances, especially the thyroid and adrenals.
c. Diabetic tendencies.
d. Certain hematogenous and hepatic disturbances.
e. Certain types of skin; blondes and fair skins are more susceptible than others.

3. What parts of the body are affected? Certain specific known diseases of the skin are limited to certain areas.

4. What is the nature of the work that the individual does and what are the working conditions? For example, is it hot and does the individual perspire a lot, or is it cold and is he subject to drafts, are there fumes, dust, oil, or irritating chemicals present?

5. What are the personal habits of the individual? What are his home surroundings? What does he do while not working? What is his diet? One must know all these various factors, in some cases in order to correctly differentiate between some of the various dermatoses. If the condition is diagnosed as an industrial dermatitis then it becomes a compensable disease under the laws of most states and a correct diagnosis and etiology will then enable you to treat the case properly.

The largest percentage of industrial dematoses fall under two classifications, namely, the hyperemias and parasitic infections. The hyperemias may vary from a slight reddening and itching of the skin to severe burns, pustular and vesicular formations. These conditions are caused by external irritants in most cases and we commonly term them chemical irritations.

The so-called rubber poisoning is a lay term. The etiology of this is due to some chemical used in the compounding of the rubber and two well known irritants that have been used are Hexamethylene-tetramin and Phenyl-beta Napthylamine. Pure rubber is not an irritant, except in those cases where the skin pores are covered and it may cause a small pustular eruption due to the interference with the normal function of the skin glands. All industries have their own peculiar irritations which are caused by the various substances used in their products.

Parasitic infections are very common, especially the Trichopyton group, commonly called ring worm and athletes foot. These are present in gymnasiums, shower baths, locker rooms, swimming pools and floors where there is dampness. They also are present in old shoes, boots and socks which are not frequently cleaned and sterilized. We examined two hundred men who were taking gymnasium and 85% of them show indications of ring worm infection of the feet.

Diagnosis

The following points in the history should be known:

1. Nature of work—what compound or dust, or solvent does the individual work with? How long has he worked with this substance? Has he had a similar skin condition before?

2. Does removal from contact with the substance cause improvement?

3. Is the individual of a hypersensitive type and does he have any of the factors which predispose to skin rashes? Is he allergic?

4. By the use of the Patch Test does he show a reaction?

5. Have you differentiated from the well known and well described skin diseases?

It is a very valuable procedure for the medical department to work in conjunction with the chemical and compounding departments and is especially so where new compounds and chemicals are going to be used. Many skin defects and diseases are present in the working men who apply for employment that have no connection with their work. From January, 1919 to January, 1925, 3230 special examinations were made for special employment and 10.5% had some kind of skin affection which varied from Acne to Ring Worm and was not connected with occupation.

Many cases of pre-employment skin conditions become worse when exposed to fumes, irritating chemicals and extremes of heat and cold. Open lesions on the skin from trauma may be starting points of a dermatitis if some

chemical irritant gains access. The differential diagnosis is the most important factor when confronted with an unknown skin affection. Occasionally a self-inflicted dermatitis is encountered and gives one a lot of trouble.

Preventive Measures

Before placing an individual on any job where there is a possibility of any irritating substance he should have a complete examination. You should find out whether in his past history he was subject to hives, eczema, hayfever, asthma or any allergic reaction. Eliminate such conditions as hyperthyroidism, diabetes, nephritis, acidosis, neurasthenia, chronic constipation, endocrine disturbances and poor body cleanliness. Select dark skin individuals and brunettes in preference to fair skin individuals and blondes. Establish proper ventilation for the removal of irritating fumes and dusts.

The worker should be instructed about his job and told of the various substances used. He should be furnished with all the best protective appliances, such as gloves, aprons, boots, respirators, gas masks, goggles, and coveralls. These should be kept clean and inspected frequently.

If after proper protection and instruction has been given and cases of dermatitis develop, then the substance causing the trouble should no longer be used. The proper procedure is to test all substances being used as to their toxicity and proneness to produce dermatitis.

Lockers should be supplied which are air-tight and dust proof for the street clothes and lunches. These should be kept in a clean and hygienic condition. All locker rooms and gymnasiums should be kept clean and frequently cleaned with hot water and steam and the floors treated with zinc chloride solution. If there are many using the bath rooms where there is a possibility for the spread of Trichotophan infections chemical foot baths are very beneficial.

Treatment

Some cases of mild dermatitis can be cured while the individual continues to work, by using bland lotions and protective ointments which contain some waxes. Severe cases must be removed from contact with the substance, treatment instituted and if one does not get results, the individual should be taken out of the factory and kept at home or sent to the hospital. In susceptible cases due to some organic conditions, these should be treated in conjunction with the skin treatment.

Preventive measures should be increased and the individual should be checked frequently if he returns to the same job. Some individuals develop an immunity to a varying degree against certain irritants. Complete blood and urinary examination should be made and if any pathological condition is found, treatment should be instituted.

In cases of athletes foot or ring worm, personal instruction, segregation from the baths and locker rooms and the use of fungicides, especially those containing zinc and mercury compounds, which seem to be the most effective.

Conclusion

Industrial dermatitis cases are decreasing in number because they are being studied more. Industrial physicians have found that prevention is the best policy. A closer co-operation between the chemical, compounding and medical men has developed in an effort to prevent toxic conditions in industry. Many cases of dermatitis can be prevented if proper protective measures are used and proper instruction is given to the workers. Careful selection of individuals and careful supervision will eliminate many cases of dermatitis. Frequent examinations of the personnel and inspections of places where irritants are used will eliminate much treatment at a later date.

Stedtex—a New Silk Fabric

DESCRIBED as the only fire-resistant waterproof fabric yet to be introduced on the market, Stedtex, product of the Stedfast Rubber Company, Inc., of Mattapan (Boston), Massachusetts, a new silk fabric, treated with rubber, has made its appearance. It is a lightweight waterproof fabric said to be smoother and daintier than the original pure dye silk from which it is made, yet as thoroughly serviceable as the heavy fabrics it replaces.

According to its manufacturers Stedtex, unlike rubber sheeting or oiled fabrics, is unaffected by the sun. It will not peel, crack or curl. Oil does not deteriorate it. Further claims made by the company state that it will not decompose with age, nor will it harden, mildew or develop bad odors. It is furnished in 10 different colors including all of the popular shades.

This new protective fabric may be used for manifold purposes. Some of these include raincoats, shower curtains, umbrellas, nursery and crib sheeting, dress shields, linings for hand bags and tobacco pouches.

Properties of Pliofilm

THE transparent wrapping material made from crude rubber introduced by the Goodyear Tire & Rubber Company, of Akron, under the trade name of Pliofilm, a description of which appeared in our previous issue, is especially recommended by Goodyear for use wherever a moisture-proof coating is required. The material is inherently moisture proof and consequently requires no coating to obtain that advantage, and its moisture resistance is not decreased by wrinkling or creasing. Pliofilm can be heat-sealed through a temperature range from 105° to 130° C. It is highly resistant to tear, possesses stretch to a surprising degree, resists puncturing when drawn over sharp corners, is not affected by humidity changes and is resistant to the action of oils and greases. The new material is being offered by Goodyear in two thicknesses, that 0.00010 inch having a yield of approximately 25,000 square inches per pound, while the 0.00014 thickness runs about 18,000 square inches per pound.

Kosmobile Carbon Black

ACCORDING to its manufacturers, the United Carbon Company, the recently-introduced dustless carbon black, Kosmobile, is free-flowing and non-flying. This new structure type of a semi-fluid reinforcing material has the formation of small pellets, with a construction sufficiently strong to withstand handling and packaging but exhibiting a degree of texture to ensure immediate disintegration when subjected to the action of a rubber mill. It also offers the advantage of being clean to handle and lessens the dust evidenced by emptying bags of heavy compressed black. This free-flowing black can be incorporated in rubber with saving in processing time under certain conditions. Kosmobile is produced under rigid control to insure high uniformity in its physical and chemical properties.

Accelerated Aging Tests

EXISTING accelerated age tests, which should always be checked for final conclusions by natural age tests, require from three to fourteen days, or more, to complete. Preliminary approximate aging information, which should also be checked by natural age tests, may be obtained by heating samples for two hours or so in the Geer Oven at 150° C.—*R. R. Olin Laboratories.*

Anhydrex Rubber Insulation

Rubber Insulating Compound Developed for Use on Wires and Cables Subjected in Service to Water Submersion

A SPECIAL rubber insulating compound used on wires and cables that are subjected in service to partial or complete submersion in water has been developed by the Simplex Wire & Cable Company. This new compound is known as Anhydrex. * Its resistance to the absorption of water makes it suitable for use on non-leaded communication and power cables and every type of non-metallic underground cable. Its advantages, as outlined by the company, over previous insulating materials, as well as its universal adaptability, justify a review of its development and characteristics and a brief discussion of the history and design of such insulated cables.

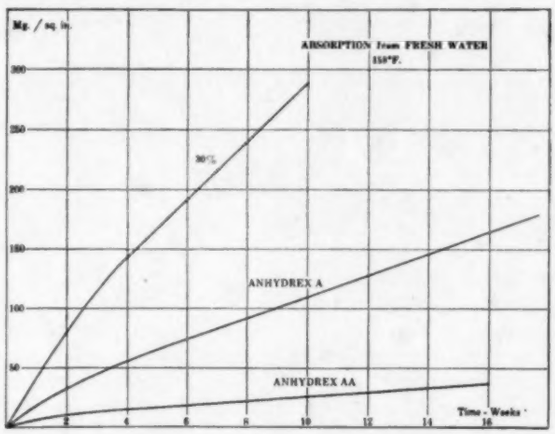
Early submarine cable engineers and manufacturers did not use rubber insulation because uniform, dependable, waterproof rubber insulating compounds were not then available. Underground cables with rubber insulation were lead sheathed to prevent the entrance of water. Practically every objection to rubber insulation for submarine and non-metallic underground cables has been overcome by Anhydrex. Its developments, through recent achievements in rubber technology, makes an interesting chapter of the story of rubber insulation.

Historical

The feasibility of submarine cable telegraphy was suggested by Salva, a Spaniard, in 1795 and the first experiment of which we have a record was made in 1803. Practical submarine cables were laid about 1840, their insulation consisting of fibrous material, such as jute or hemp, saturated with tars and pitches to form a continuous water-repelling sheath. They were moderately efficient until water penetrated to the conductor, thereby terminating their usefulness.

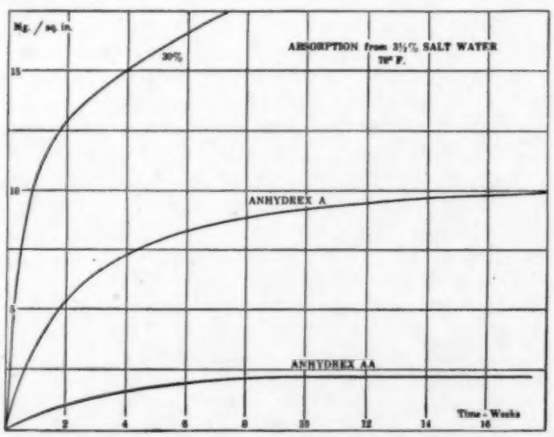
In 1842 Samuel Morse, inventor of the telegraph, transmitted signals over a short length of cable laid in New York harbor, india-rubber forming part of the insulation. About six years later the use of gutta-percha was suggested by Faraday and in 1849 an experimental telegraph cable so insulated was laid in the English Channel. Satisfactory results led to a rapid development and during the next decade many other cables were insulated with gutta-percha and put into service in European waters and one between Ireland and Newfoundland was the first transoceanic cable between Europe and America.

Early in this century cable communication became necessary between Seattle, Washington and Sitka, Alaska. Eighteen hundred miles of submarine cable were required and as a matter of policy it was manufactured in the United States. Since domestic cable manufacturers had neither the equipment nor experience to enable them to use gutta-percha thirty per cent rubber insulation was used, embodying the then latest developments in rubber compounding. The cable was laid in 1904 and was successful at first but within a few years water absorption began to interfere with its operation and eventually complete failure occurred. It was subsequently replaced by a gutta-percha insulated cable of foreign make. This costly experiment emphasized the superiority of gutta-percha over the best rubber insulation then available and all of

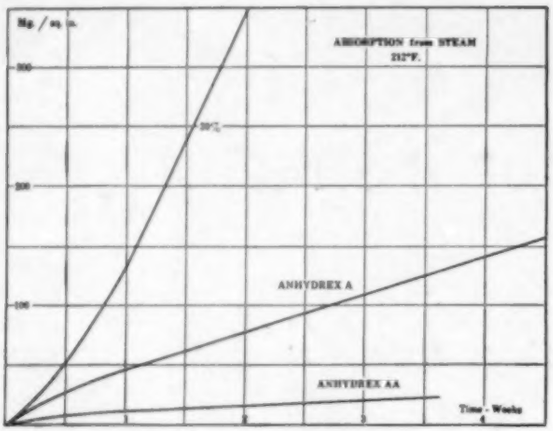


Absorption from Fresh Water at 158° F.

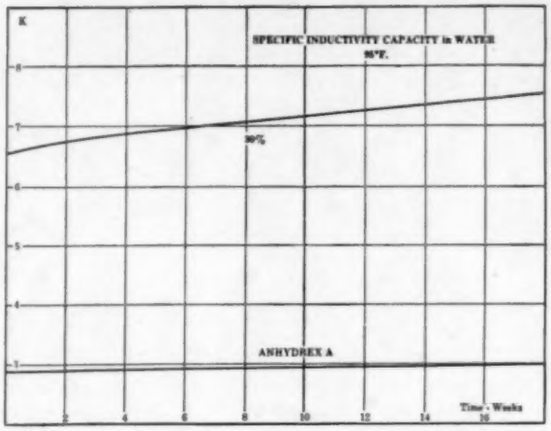
Data and information for this article was furnished by the Simplex Wire & Cable Co.
* Patent Pending.



Absorption from 3½% Salt Water at 70° F.



Absorption from Steam at 212° F.



Specific Inductivity Capacity in Water at 95° F.

the hundreds of thousands of miles of deep sea cables in operation today are insulated with gutta percha. None of these cables were made in the United States.

Gutta-Percha

Gutta-Percha is derived from the milky exudation of gutta trees in a manner somewhat similar to that of obtaining Hevea and other rubbers. Gutta-percha was acceptable as insulation to both cable manufacturers and engineers because of the ease with which it could be manipulated, its good electrical properties, and its resistance to water absorption. Its high price and excessive tendency to deteriorate when exposed to air encouraged the development of a rubber insulating compound which combines the desirable characteristics of gutta-percha with the low cost and other qualities which have made rubber the best insulation yet discovered for electrical conductors.

The invention of the incandescent bulb in 1879 by Edison was the impulse that created the industry of generating and distributing electric power and the need for both submarine and underground power cables was a natural part of this development. Proper protection of the insulated conductors from contact with moisture has been an ever present problem, a temporary solution being the use of lead sheaths. Increased size and weight of power cables, increased current loads, as well as temperature fluctuations due to variable loads, electrolytic and chemical deterioration of cable sheaths, and several other inherent operating conditions have demonstrated conclusively that the use of lead sheaths in power cables is not a final solution to the problem of correct design for cables to be operated in moist or wet locations. Non-leaded rubber insulated cables in wet ducts or buried in the ground have not been universally successful.

Development of Anhydrex

Obviously, the first step toward the control or elimination of water absorption was a thorough, systematic study of the phenomenon itself. This involved the determination of rates of absorption under varying conditions by different types of rubber compounds, the effect of temperature, the influence of materials dissolved in the water and the ultimate effect of these factors on the electrical properties and submerged life of the insulating material.

No systematic study of water absorption by rubber was undertaken until about 1920, although it was known long before, that rubber insulating compounds would be preeminently adapted to submarine work when, and if, the problems relating to water absorption were solved. More than a hundred years ago it was recognized that rubber was permeable to water. Hancock, in his classical experiment, sealed a quantity of water in a bag formed of raw rubber and recorded the loss in weight of the assembly over a period of years during which the water diffused through the rubber and evaporated.

The phenomenon of the absorption of water by rubber is a curious one since rubber is properly regarded as waterproof. It does repel water efficiently when the exposure is intermittent and an intermediate drying period ensues but when exposure to water is continuous the rubber steadily increases in weight due to absorption. Rubber raincoats serve their purpose admirably. If the amount absorbed is large enough the rubber becomes soft and flabby, gradually turning gray or white. At high temperatures unvulcanized rubber may absorb as much as five hundred per cent water, becoming practically disintegrated, and it is interesting to note that under these conditions more water is associated with the rubber than when it was originally in the form of latex. Vulcanized rubber resists absorption to a greater extent than the unvulcanized material.

If samples of rubber soaking in water are removed at intervals, wiped dry and weighed, curves relating the time of soaking and the increase in weight may be plotted. These curves are of the "die-away" type tending to fall into two classes—those that eventually reach an equilibrium condition in which the weight no longer increases and those in which the absorption appears to continue indefinitely. Vulcanized rubber in cold salt water is definitely of the equilibrium type while unvulcanized rubber in hot fresh water falls into the other classification. Depending on the quality of the individual sample of rubber, intermediate conditions may develop either type of absorption but the difference may not become apparent until after an extended period of time.

The rate of absorption and the equilibrium values increase with temperature. For the former this increase is logarithmic, approximately doubling for each thirty-five degrees Fahrenheit. This constant allows direct comparison of data obtained at different temperatures. Materials dissolved in the soaking medium decrease both the rate of absorption and equilibrium values. This is completely in accord with osmotic theory and fails to apply only when the solute is soluble in the rubber. Sodium chloride is the principal material encountered in subaqueous installations. A three and one-half per cent solution corresponds closely to sea water in effect and in such a medium the rate is reduced 40-60% from its value in fresh water.

Electrical Characteristics of Cables

In both submarine and underground cables the electrical properties and their permanence are of primary importance, and since the absorption of water is the major controlling factor its effect is of great moment. It is desirable to have the capacitance and power factor low and the insulation resistance and dielectric strength high but each of these properties is adversely affected by the presence of any appreciable amount of absorbed water. In submarine cables used for signalling, where the voltage is low, the dielectric strength need not be considered because of the high factor of safety but in power cables the lowering of this property is usually the immediate cause of failure.

Conductance and capacitance in a telephone cable, especially the latter, determine to a considerable extent the effectiveness and practicability of the installation. In a telegraph cable the electrical properties control the working speed and each cable has a definite speed limit that cannot be exceeded without rendering the signals unintelligible. The first Atlantic cable had a working speed of only fifteen letters a minute.

Decrease of capacitance is the most direct and efficient method of improving the transmission qualities and may be accomplished either by increasing the thickness of the insulation, thereby rapidly increasing expense and weight, or by lowering the dielectric constant (specific inductive capacity) of the insulation.

The figures below show the advantageous position of Anhydrex in this respect.

Material	*1000 Cycle Dielectric Constant*	*Power Factor*
Ordinary 30% Rubber	5.5	3.5
Gutta-Percha	3.1	1.0
Anhydrex	2.75	0.8

The new compound is particularly suitable for submarine power cables. Its dielectric strength is appreciably higher than the usual thirty per cent insulations, thereby insuring an increased factor of safety. Its low dielectric constant reduces charging current. Its low capacitance tends to prevent corona formation on the surface of rubber insulation where it is exposed to air at the ends of a high voltage cable thereby preventing the generation of ozone with its attendant deteriorating effect on the rubber. *

Electrical Effects of Water Absorption

The electrical properties of rubber are very sensitive to comparatively small amounts of absorbed water and this can be illustrated by plotting one of the properties against the time of soaking or by plotting it against the amount of water absorbed and this in turn against the time. It might be expected that the same amount of absorbed water would affect all rubbers equally regardless of their original characteristics but some compounds seem to be comparatively unaffected by the absorption of a moderate amount of water while others are deteriorated excessively by an equal contamination.

All rubbers do not absorb water at the same rate and efforts have been directed toward the development of rubber insulation that will have not only excellent initial characteristics but also a low rate of water absorption and satisfactory equilibrium properties, both electrically and physically. All these characteristics of the phenomenon of water absorption convey an idea of the real problem—the search for the critical factors and the production of superior rubber insulation. Prolonged study finally gave a practical solution to the problem in Anhydrex which has a very low rate of water absorption and excellent initial physical and electrical properties that are practically permanent.

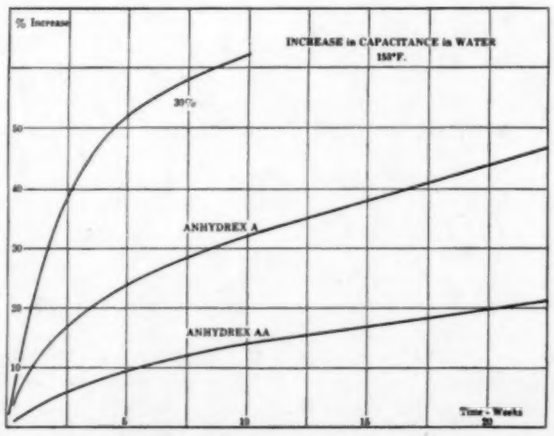
To meet all possible needs the Simplex company has evolved two grades of Anhydrex submarine insulation, A and AA. The better grade (AA) is superior to gutta-percha in all respects and is suitable for underwater use anywhere. For certain restricted conditions tending to promote low water absorption, such as low temperature salt water, the slightly cheaper grade (A) can be used with satisfaction. Compared with gutta-percha the cost of either is small.

Special Tests for Subaqueous Insulation

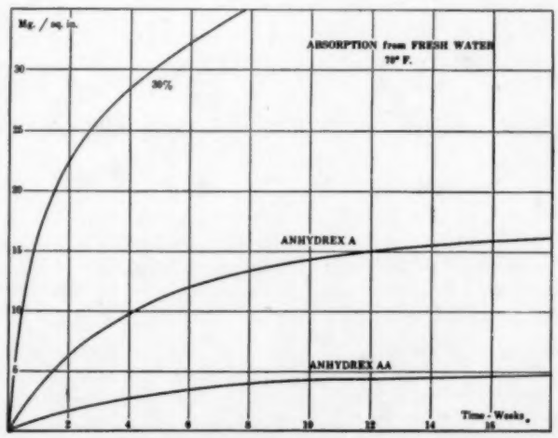
In order to predict the physical and electrical behavior of subaqueous insulation over a period of years, special tests have been devised. These have as their object the speeding up of the absorption of water which may be done either by decreasing the thickness of the rubber, raising the temperature of the water, or using fresh water in place of salt water.

One such test is to place a very thin sheet of rubber in an electrode which exposes it to the action of water on both sides. The electrical behavior over a short period of time parallels the action of thick insulation during a longer period. Exposing rubber insulated wire to water at 158°F. or at 212°F. so speeds up the absorption that the electrical deterioration from years of service can be predicted from a few days observation. Water absorption measurements at elevated temperatures also assist the prediction. It is of interest that the absorption from

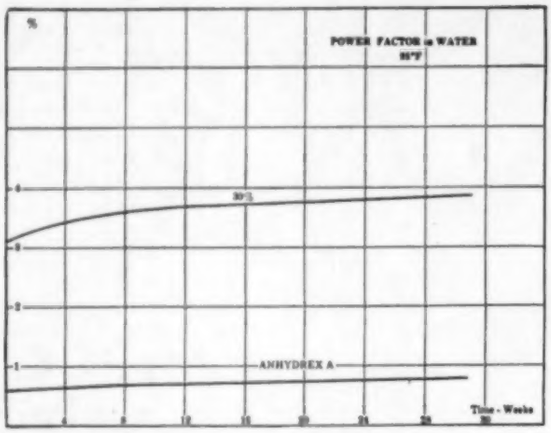
* U. S. Patent No. 1,791,402.



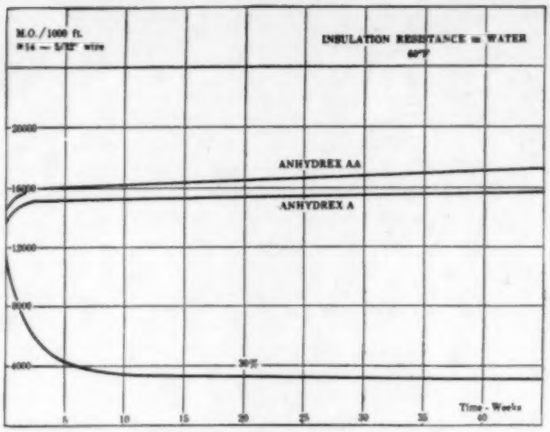
Increase in Capacitance in Water at 158° F.



Absorption from Fresh Water at 70° F.



Power Factor in Water at 95° F.



Insulation Resistance in Water at 60° F.

fresh water at 158°F. for one day is approximately equivalent to the absorption in about three years from subtropical sea water. One of the principal values of these tests is that they can be used to compare the merits of various products and thus serve as valuable tools in the development of improved insulation.

The plots * compare the absorption qualities, capacitance, power factor and insulation resistance of these new compounds with the ordinary type of 30% compound. The superiority of Anhydrex is self-evident.

In 3½% salt water at room temperature the equilibrium absorption of Anhydrex A is about ¾%, while that for Anhydrex AA is about ¼%. Gutta-percha gives values of over 1%.

Physical Characteristics of Anhydrex

If the electrical properties of rubber insulation are satisfactory, the only other normal requirement is that the physical properties be adequate and permanent. The hardness must be great enough to provide resistance to physical distortion during manufacture and in service. The aging of rubber due to oxidation is negligible in water but the ends of the cable where they emerge from the water must have good resistance to atmospheric aging.

Anhydrex has the following physical characteristics, indicating that this new type of rubber has good original properties and also excellent resistance to atmospheric aging, while gutta-percha is worthless in this respect.

	Anhydrex		*Thirty Per Cent*
	AA	*A*	
Tensile Strength, Original Pounds per sq. in.	2100	2100	1400
Tensile Strength 48-Hr. Oxygen Bomb	1700	1700	1000
Elongation, Original	550%	500%	500%
Elongation 48-Hr. Oxygen Bomb	500%	450%	400%

Non-Metallic Underground Cable

The greater part of the wires and cables of the future will be laid underground. Municipal ordinances, the interruption of service by sleet and other storms, the aging and deteriorating effects of the atmospheric elements, the unsightliness and high installation and maintenance costs of pole lines, are factors leading to the increased use of underground installation.

Underground services are of two types; those laid in ducts and those buried directly in the ground. The earliest underground cables were copper wires wrapped with impregnated fibrous materials such as cords, burlap or cloth, but rubber early became one of the principal insulations. Difficulty was experienced with these installations due to the fact that practically every cable, whether in a duct or not, was subjected to the action of water for some portion of its length. Electrical failure was caused by water penetrating the insulation, and the use of lead sheaths to keep out the water was almost universally adopted. Since lead is easily damaged, flat or interlocking steel tapes and other coverings were later added to protect the sheath. All of these coverings increased the cost and weight of the cable and added to shipping and handling charges.

Lead sheathed cables have other inherent disadvantages. Under certain soil conditions the metal corrodes to such an extent that portions of the sheath may be completely destroyed, ruining the operation of the whole cable. When laid near electric car lines the lead is frequently subjected to electrolysis which acts to destroy it just as effectively as does chemical corrosion. Under other conditions of laying, cables are exposed to vibration causing a crystallization of the lead which then splits at the crystal faces, rendering it ineffective as a protecting sheath. The setting up of parasitic currents in both the lead sheath and protective tapes is unavoidable and they result in decreased operating efficiency of the system. "Splits" due to oxide are not unheard of although much progress has been made in the direction of applying mechanically perfect lead sheaths to cables.

The increased cost, together with the inherent disadvantages, led to attempts to do without lead sheaths and metal tapes on underground cables but in every instance water eventually reached the conductor causing unsatisfactory operation or complete failure. It became evident that lead and steel protection could not be eliminated until a really water-proof insulation could be produced.

Although Anhydrex rubber insulation was developed originally for submarine cables of all types, it becomes logically the insulation for underground systems that may be exposed to the action of water. The Simplex non-metallic underground cables are of two general types—those having Anhydrex as the insulation on the conductors, and those having, in addition, an outside jacket or belt of Anhydrex rubber, thereby providing double assur-

(Continued on page 186)

* Note different time and absorption scales on these plots.

Halogenated Rubber Products

By Frederick Marchionna

Author of "Latex & Its Industrial Applications"

THE abstracts on halogenated rubber, compiled by Mr. Marchionna, in the course of an investigation of patents on rubber derivatives, are continued herewith. It is planned to incorporate this material into book form at a later date to supplement the author's bibliography "Latex and Its Industrial Applications." Because of the renewed interest in chlorinated rubber in the past few years these abstracts are being brought to rubber technologists. The 31 preceding abstracts will be found in the November and December, 1934, issues of THE RUBBER AGE.—EDITOR.

32.—Ellis & Boehmer; U. S. Pat. 1,544,534, June 30, 1925; *Chlorinated Rubber.*

A perchlorated rubber of 73 to 74% chlorine content is obtained by passing chlorine under high pressure in a chlorinator containing crude rubber in form of sheets. A number of thin rubber sheets (100 grs.), which may have been masticated to render the rubber more permeable to the action of the halogen, are placed in racks in the chlorinator. Chlorine gas under a pressure of 100 to 125 lbs./sq. inch is passed from a liquid chlorine cylinder into the chlorinator. The chlorination is started at 18° C. but as the reaction proceeds it gradually increases to 27°C. when the pressure in the chlorinator is 130 lbs. Complete chlorination takes about 168 hours, and the apparatus is vented every 24 hours to remove any hydrogen chloride formed. At the end of the reaction the product weighs 357 grs. It is of a light creamy color and has a vesiculated structure. This perchlorinated rubber may be ground and washed in boiling water whereby the mass will swell greatly and will have a very light and porous structure which can be further ground and washed until the product is of a good white color. Gutta-percha can be likewise treated.

33.—Ellis & Boehmer; U. S. Pat. 1,544,535, June 30, 1925; *Chlorinated Rubber.*

A modification of U. S. Patent 1,544,534 for obtaining perchlorated rubber from crude rubber or latex. Three examples are given. In one example, crepe rubber (202 grs.), in the form of loosely wound spirals, is placed in the lead-lined iron chlorinator and chlorine under pressures varying between 85 to 132 lbs./sq. inch is passed into the chlorinator which is initially kept at about 23°C. The chlorination is continued for about 300 hours, venting the chlorinator every 24 hours, to remove any hydrogen chloride formed. Near the end of the reaction the chlorinator has reached a temperature of about 44°C., and the product weighs 707 grs. It is washed to remove any uncombined gas and hydrogen chloride, and the washed product is vesiculated and of a yellow or greenish color. In the other examples higher pressures and temperatures are used with considerable reduction in the time of treatment. The products obtained are in all cases yellowish or white in color, are stable at 120°C., but decompose above 170°C. They are easily soluble in the ordinary solvents for rubber. (For the example in which rubber latex is employed see "Latex and Its Industrial Applications," Abstract No. 2180, page 765.)

34.—Boehmer; U. S. Pat. 1,572,065; Feb. 9, 1926; *Chlorinated Rubber Varnish.*

An acid and alkali coating material is made by combining a chlorinated rubber of 67% chlorine content or more and a cumarone resin, preferably the harder grade commercially known as "varnish grade," these constituents being mixed in any desirable proportions depending on whether it is desired to have a hard or soft coating film. In one example there are used 3 parts of cumarone resin and 1 part of chlorinated rubber, which, dissolved in benzol, toluol, xylol, naphtha or mixtures thereof, will yield a solution containing 50% or more solids. In another example there are employed equal quantities of cumarone resin and chlorinated rubber dissolved in a suitable solvent giving a varnish containing about 40% solids. When larger quantities of chlorinated rubber are employed there will be obtained tougher films. Such varnish materials are particularly adapted for coating concrete surfaces, since the alkaline substances in the concrete cannot attack the coating layer.

35.—Beebe & Murray; U. S. Pat. 1,587,271; June 1, 1926; *Photo-Sensitized Sheet.*

Natural resins including asphaltum, india-rubber, gutta-percha, rosin, copal, etc., can be employed as photographic media in which the photo-sensitizer can be incorporated. The resinous medium in which the sensitizer is added can be made into films, or spread on any photographic base sheet. The composition may contain rubber, rosin or asphaltum (10); naphtha (40); benzine (25); sensitizer (25). The sensitizer may consist of ethyl methyl ketone (22); iodoform (12); naphtha (65.5); concentrated ammonia (0.5). This coating is flowed to any grained or smooth backing surface, and dried. The coated surface is then exposed to a luminous image by contact or by optical projection for ½ to 4 minutes, and the print is developed in a liquid containing oleic acid (50) and white mineral oil (50) by rubbing the developer softly with any suitable medium. The developed print is rinsed with dilute ammonia and water. Any halogen compound which frees nascent halogen under the action of light may be employed. Hydriotic acid and iodoform with rubber will produce highly sensitive film. A suitable material may contain also hydrogen iodide (10); iodoform (20); a natural resin (79); and a small quantity of ammonia as stabilizer. Or a colloidal sensitizer containing lead triethyl iodide (4.2 grs.) dissolved in 30 cc. of benzene; a natural resin (3 grs.) dissolved in 15 cc. of naphtha; iodoform (3 grs.) dissolved in 20 cc. of ethyl methyl ketone.

36.—Bradley & Gibbons; U. S. Pat. 1,627,725; May 10, 1927; *Halogenated Rubber.*

A process for making chlorinated rubber latex or crude rubber is described in Abstract No. 2183 (see "Latex and Its Industrial Applications"). In a variation of the process there is obtained the hydrohalide of chlorinated rubber as follows: finely ground high grade scrap rubber tubes previously extracted with acetone, alkali, etc. (350) are dissolved in benzol (5000) and hydrogen chloride gas is passed into the solution until no more gas is absorbed, after which chlorine gas is introduced to complete the saturation of the rubber molecule and thus obtain a chlorinated rubber hydrohalide. As the reaction is exothermic care should be taken that the reaction vessel is cooled with a water jacket. This product is soluble in benzol, chloroform, carbon tetrachloride, etc., and its solution can be used as a coating material. Bromine, iodine and its acids may be used.

37.—Emery; U. S. Pat. 1,631,722; June 7, 1927; *Halogenating Rubber Surfaces.*

A variation of the process described in U. S. Patent 1,532,234. The base fabric is rubberized in the usual way by first spreading a dilute rubber solution and then frictioning a heavier rubber coating on one or both sides of the sheet, and soaping the coated surface. The coated fabric is then dried and vulcanized. The rubber is then given a coating of shellac dissolved in alcohol to which there may be added a small amount of glycerine. After the alcohol has evaporated the shellac surface is treated with a solution of bromine, hydrogen bromide or sulfur chloride in carbon tetrachloride. Any of these solutions will indurate the shellac to produce a tough, hard skin which bonds tenaciously with the rubber surface. The halogenating solution, moreover, penetrates also to the rubber surface indurating it and binding more tenaciously the shellac coating. The surface-treated sheet is finally neutralized in an atmosphere of gaseous ammonia. The treatment may be varied by first halogenating the cured rubber surface, applying the shellac coating and halogenating. If the rubber contains pigments like ultramarine blue, the indurating process should be effected in an atmosphere of the halogenating agent without the solvent to prevent discoloration of the rubber.

38.—Boehmer; U. S. Pat. 1,635,812; July 12, 1927; *Chlorinated Rubber Varnish.*

A clear and stable varnish can be made by mixing a chlorinated rubber of a pre-determined chlorine content with tung oil boiled to a definite degree. For each degree of chlorination there exists a degree of oxidation or polymerization of the oil within which clear and stable solutions of the two ingredients may be prepared; a deviation from these conditions may result in turbid, opaque solutions. Rubber containing 67% or more of combined chlorine has higher solubility than the corresponding lower chlorinated products. In a specific example chlorinated rubber of 67% chlorine or more (25) is dissolved in naphtha (50). China wood oil (75) is then combined with rosin (12) and the mixture cooked for 45 minutes at 200°C., allowed to cool and admixed with the solution of chlorinated rubber. The fluid composition is permitted to stand to allow for sedimentation, decanted into another vessel, and aniline, urea, etc., added as anti-acid materials. Softeners, such as the aryl phosphates or alkyl phthalates, may be incorporated in the varnish. Pigments or oil-soluble dyes may be ground into the varnish. The resulting paint may be painted or sprayed on metal surfaces.

39.—Ellis; U. S. Pat. 1,695,636; Dec. 18, 1928; *Chlorinated Rubber Products.*

Raw or deresinated rubbers can be chlorinated in solid form, preferably in the presence of 10 to 20% of a rubber solvent, to obtain chlorinated products containing from 50 to 67% of chlorine or more. Thus, fragments of rubber are placed in a chlorinator into which there is added from 10 to 20% benzol, and chlorine is admitted under gradually increasing pressure, the chlorine being introduced preferably at atmospheric pressure at the start and increased gradually up to 50 to 60 lbs./sq. inch. The reaction is preferably carried on at room temperature. The resulting product, which is semi-fluid, is washed with water or weak alkaline solution to remove any uncombined chlorine or formed hydrogen chloride and dissolved in a solvent to obtain coating solutions of high concentration and low viscosity.

40.—Ellis; U. S. Pat. 1,695,637; Dec. 18, 1928; *Chlorinated Rubber Cements.*

Leather, shoe-parts, press boards, etc., are joined into laminated articles by means of a highly concentrated solution of chlorinated rubber. In one example 20 lbs. of chlorinated rubber of 67% or more chlorine content is dissolved in 80 lbs. of carbon tetrachloride. In another example the cement is made by dissolving 40 lbs. of the chlorinated rubber in benzol (80 lbs.). These highly concentrated solutions are spread easily on any surface to be joined to another surface. For cementing paper products it is preferable to incorporate up to 70% of finely divided fillers, such as whiting, barytes, silex, asbestos, wool, wood flour, sawdust, etc., in the chlorinated rubber.

(To Be Continued)

Anhydrex Rubber Insulation

(Continued from page 184)

ance of uninterrupted service. Both types have an additional mechanical protection of saturated fibrous coverings. For special service conditions such as installations in ducts, a hard service rubber jacket is sometimes substituted for the fibrous covering on the first type of cable. Obviously rubber jackets are not susceptible to the progressive disintegration that normally occurs to the fibrous protection. Anhydrex completely eliminates the need for a lead sheath as a protection against water.

Underground cables must possess, in addition to a resistance to water, the ability to resist many other chemical influences. Industrial wastes frequently permeate the ground through which cables of this type pass. Anhydrex is particularly resistant to acids and alkalies, as illustrated by the following table. The values are given as the increase in weight, due to absorption, recorded as milligrams/sq. in. of surface, after a 28-day soaking period at room temperature and at 158°F.

Room Temperature	*HCl*		*NaOH*	
	5%	*10%*	*4%*	*10%*
Anhydrex A	3.9	2.6	1.1	0.0
30% Insulation	7.9	7.9	13.2	15.3
40% Insulation	17.2	47.5	4.9	1.2
158° F.				
Anhydrex A	16.6	42.3	0.0	0.0
30% Insulation	79.6	65.5	119.0	86.7
40% Insulation	364.0	318.0	16.9	12.5

Summary

Anhydrex rubber insulation is the culmination of a lengthy research program and for the first time allows rubber to be used with entire success for submarine signal cable insulation. The universal use of gutta-percha for this type of service has remained unchallenged for over three-quarters of a century in spite of its obvious disadvantages. The new material not only duplicates but exceeds gutta in the properties that have made the latter supreme. Its electrical properties are equal to gutta-percha in every respect. The disadvantages of the negligible resistance to atmospheric aging and the high cost of gutta have been successfully overcome. Its density is quite comparable with gutta and is only a fraction of that of the regular type of 30% compound. The AA grade of Anhydrex can be laid anywhere, while the A material, being equal to gutta, can be used with assurance in many places. Anhydrex is preeminently adapted for use on underground and submarine power cables.

Lead sheaths and steel tapes can safely be eliminated from underground cables thereby doing away with electrolysis, corrosion, crystallization and sheath currents. Transoceanic signal cables can now be manufactured in the United States with the assurance that they will give superior service over an indefinite period, making this country finally independent of other nations in this respect.

Anhydrex rubber insulation meets the following electrical and water absorption specifications:

Electrical

Dielectric Constant (Specific Inductive Capacity)	— 2.80 at 1000 Cycles
Power Factor	— 1.0% at 1000 Cycles
D. C. Insulation Resistance Constant	— 35,000 M.O. per 1000 ft. at 60°F.
Dielectric Strength	— 800 volts per mil at surface of conductor — 10 ft. lengths

Water Absorption

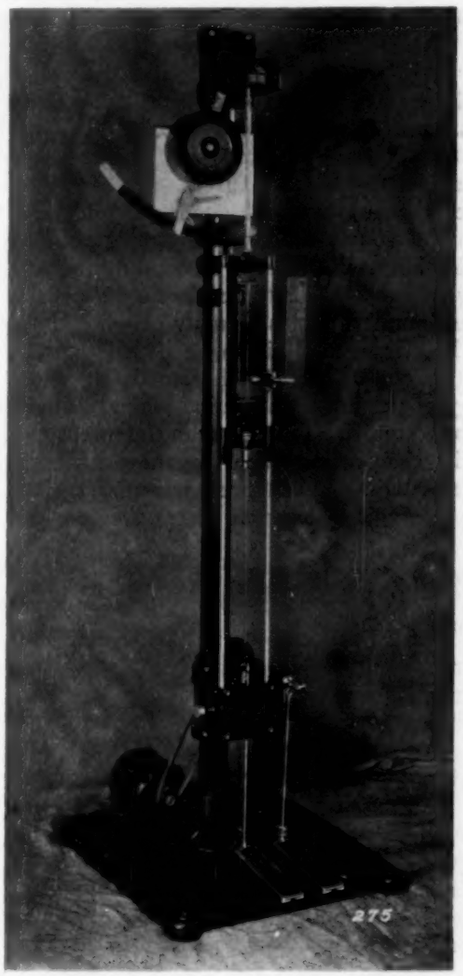
Anhydrex A	— 0.020 grams per sq. in.
Anhydrex AA	— 0.010 grams per sq. in.

[from distilled water at 158°F. in seven days (168 hours)]

New Equipment

New Scott Testing Machine

WITH the keynotes of simplicity, efficiency, and accuracy, a new tensile strength testing machine for rubber has just been introduced by the Henry L. Scott Company, 101 Blackstone Street, Providence, Rhode Island. The new testing machine, known as Model L-P, is



of the dead weight type, motor driven, with spark type recorder. It is equipped with a chart for recording stress-strain data, with a large clear dial scale in convenient reading position. A new transparent elongation measure is placed in front of the specimen and acts as a safety guard against any injury to the operator from flying pieces of the specimen being tested. Featuring convenience the new tester has a coil for spark for recorder in an accessible location, a button for control of spark intervals on the record, a flexible type of draw bar, made of stainless steel, and a heavy iron base which saves installation expense since the machine requires no fastening to wall or floor. Efficiency items include a transformer for the spark coil circuit which eliminates batteries, foot pedal controls and no lost time involved because of the instantaneous return of the pulling jaw to starting position. Model L-P sells for $350.00 complete, F.O.B. Providence.

Book Reviews

THE SCIENCE OF RUBBER. (Handbuch der Kautschukwissenschaft). Edited by Prof. Dip.-Ing K. Memmler. English translation edited by R. F. Dunbrook and V. N. Morris of the Research Staff of the Firestone Tire & Rubber Company, in collaboration with the members of the Firestone Research Laboratories. Published by the Reinhold Publishing Corporation, 330 West 42nd Street, New York City. 770 pp. $15.00.

Although excellent books have been published in English on plantation practice and on the technology of rubber no thorough treatise on the entire science of rubber has been available. The translation of Professor Memmler's book from German to English was prompted by the belief that American and British rubber scientists and technologists would welcome a comprehensive work in English covering not only latex, crude rubber, the chemistry of rubber, vulcanization, etc., but also such diverse fields as microscopy and pigment dispersion, the physics of rubber, and the latest development in specialized equipment for physical testing. Much credit is due the research workers of Firestone for their diligent efforts in translating this book, correcting obvious errors, but in the main adhering to the German edition, which first appeared in 1930. The contents of the book is revealed by the title—The Science of Rubber. It treats with practically every known phase from cultivation to theories of rubber structure. It may properly be termed one of the major additions to informative literature on the science and technology of rubber.

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1934 BOOK OF A.S.T.M. TENTATIVE STANDARDS. Published by the American Society for Testing Materials, 260 S. Broad Street, Philadelphia, Penna. 1250 pp. $7.00.

The 1934 edition of the A.S.T.M. tentative standards, which are issued as proposed standards, contains 236 items, of which 48 are included for the first time. About 60 standards were revised in 1934 and appear in their latest approved form. These standards cover such fields as ferrous and non-ferrous metals, paints, varnishes, petroleum products, road materials and rubber products. Among specifications which appear for the first time are those for insulated wire and cable (Class A, 30% Hevea rubber compound), vulcanized rubber (test for compression set), and rubber compounds (test for abrasion resistance). In addition to the 236 tentative standards the 1934 edition includes all proposed revisions of standards which are published to elicit criticism before final adoption. Changes in 60 standards have been proposed.

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MECHANICAL RUBBER GOODS. Catalog No. 34. Distributed by the New York Belting & Packing Company, 1 Market Street, Passaic, N. J. 95 pp.

Providing a vast fund of practical information about hose, belting, packing and miscellaneous mechanical rubber products, this catalog makes an interesting piece of literature for engineers, purchasing agents and factory executives. Illustrations and complete information are given about each product manufactured by the company. Diagramatic drawings give clear outlines of various applications. Table giving belt speeds, steam pressure and temperatures, carrying capacities and dimensions, are included in the catalog. Numerous formulae on everyday problems are presented with examples of their usage.

•

INDUSTRY'S OPPORTUNITY TO PROMOTE RECOVERY. By Allen W. Rucker, in collaboration with N. W. Pickering. Published by Farrel-Birmingham Company, Inc., Ansonia, Conn. 6 pp.

Ninth in a series of booklet-editorials by the co-authors, this latest booklet treats with what the authors term "the four fallacies that retard recovery." It stresses the point that a maximum volume of trade depends neither on high nor low prices, *per se*, but upon balanced prices, i.e., "prices which promote the exchange of equal values."

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EDITOR'S NOTE: A complete review of the "Handbuch der Gesamten Kautschuktechnologie," by Dr. Ernst A. Hauser, in two volumes, will appear in the next issue.

Editorial Comment

Thank You!

THE PUBLISHERS and staff of THE RUBBER AGE wish to thank their many friends in the rubber industry for the profuse greeting cards, calendars, blotters, etc., forwarded in the spirit of good will. We are using this space to thank you, collectively, for the appreciated gesture.

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Anent Japanese Competition

PERIODICALLY complaints against the growing influx of Japanese-made goods have been registered by American manufacturers waving the flag of "cheap labor." Unfortunately, these complaints have generally been lost in the maze of red tape encircling our diplomatic corps at Washington. But now that the Administration has seen fit to regulate the wages of the employes of those American manufacturers a protest against Japanese goods has been growing steadily in volume until even Washington must take heed.

A vigorous campaign to curtail the importation of Japanese-made goods, particularly rubber toys and matches, has been inaugurated by the Toy Manufacturers of America, a trade association. Trade papers in this field are picturing American-made rubber products which have been duplicated by Japanese manufacturers and imported into this country to sell at a price much lower, in many cases one-half, than the American product. Led by executives of the Sun Rubber Company and the Seiberling Latex Products Company, the Barberton (Ohio) Chamber of Commerce has declared open war and has succeeded in enlisting the active sympathies of both the Akron Chamber of Commerce and the Ohio Chamber of Commerce.

Although manufacturers of rubber toys and novelties in America have raised the cry that the introduction of N.R.A. is in part responsible for the current situation, and therefore it rests with the Administration to protect its home industry, there is another concrete reason for the epidemic of Japanese-made goods. The boycott against rubber toys and novelties produced in Germany has materially lowered that country's export total and Germany is noted for its production of low-priced items in this category. Japan has, therefore, absorbed a great deal of this export business and in the first ten months of 1934 has increased its exports of toys to this country by more than half a million dollars.

Congressman Dow Harter, of Ohio, a militant where Japanese competition is concerned, has protested with renewed vigor the unfairness of such competition based on figures furnished him by Ohio rubber manufacturers. According to report this protest has reached President Roosevelt's desk and action is being considered by the Administration. Only two courses are open to the government: a ban against toys and novelties produced in Japan, or raising our tariff walls to force prices on imported goods up high enough to compare with American prices. This, of course, will not solve the problem of duplicated items, but would probably appease the anger of American toy manufacturers.

Since a ban of Japanese goods cannot, for obvious reasons, be considered by the Administration, it is probable that tariff rates will be duly thrashed out. Raising of tariffs usually results in reciprocal action so the Administration is actually caught between two fires. In any event it is to be hoped that this time the matter will at least be thoroughly discussed from its many angles and some action taken to alleviate the condition in which American manufacturers producing goods in competition with Japanese-made products find themselves. The figures presented by the Ohio rubber companies cannot be overlooked.

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The Strike Scourge

RUBBER manufacturers, particularly in and around Akron, are again faced with the strong-arm of labor unions—strike. The workers of the Seiberling Rubber Company, apparently satisfied with working conditions, threaten a strike, a date for which has already been voted, unless company officials sign a contract outlining wages and working conditions. This indicates merely a demand for union recognition. The union objects to Firestone laying off men in its battery department, alleging that these men are discriminated against because they can be transferred to other departments. Goodyear is presented with a request for higher wages (35 cents more per hour), fewer hours, etc.

That strikes are an industrial scourge is best shown by figures presented by the National Industrial Conference Board, of New York City. They show that an average of 2,320,894 man-days of work per month was lost through strikes during the first three quarters of 1934. This is compared to 1,050,693 man-days lost per month in 1933, an increase of 121 per cent. The total amount of man-days lost during the first nine months of 1934 on account of strikes amounts to the appalling total of 20,888,052.

If labor continues its pugnacious attitude in 1935 these figures will be materially increased. And to what end? Seldom, indeed, does labor win a sufficient victory to return in dollars and cents monies lost during extended strikes.

CURRENT • NEWS
of the Rubber Industry

JANUARY, 1935

Tire Manufacturers Predict Further Industrial Gains in 1935 With Several Price Rises Coming

Industry Leaders Estimate Tire Production in 1935 at 45,600,000 Units, an Increase of 7 to 10% over 1934— Increased Replacement Sales Seen by O'Neil of General

DESPITE increased costs in raw materials tire manufacturers made substantial gains in the year of 1934. Dollar sales, earnings, employment and morale improved throughout the industry. It is a recorded fact that from January through October, according to Dun and Bradstreet, not one single bankruptcy was reported by a manufacturer of rubber goods. Wholesalers fared equally as well, only one default being recorded. Not only did tire makers increase their sales to automobile manufacturers for original equipment but replacement tire sales underwent a considerable upturn. Because of these encouraging factors and because of additional factors visualized for 1935 leaders in the rubber industry are predicting, with few exceptions, a healthy commercial year.

Approximately 3,000,000 more tires were produced in 1934 than in 1933. Contrary to the records of former years tire factories maintained an almost even pace on production throughout the year as compared with the spurts and declines registered in previous years. Several leaders have estimated a further production increase of between 7 and 10% for 1935.

J. W. Thomas, president, Firestone Tire & Rubber Company, in addressing the annual stockholders' meeting in Akron, last month, asserted the Firestone factories operated at an average of 75% in 1934 compared to 60% in the preceding year. For the current year he predicted an average gain of 7% over 1934. He stated that "if present estimates hold good we expect to operate this year at 82% of capacity." Mr. Thomas revealed that the company had given employment to 28% more people in 1934 than in 1933 and had "practically doubled the number of man hours worked."

Frank A. Seiberling, president, Seiberling Rubber Company, is duly enthusiastic about the 18% price rise on tires recently instituted and freely predicts another 10% advance within two months. Tire predictions for 1935 run to more than 45,600,000 units.

Another point made by the larger rubber manufacturers concerning profit possibilities in 1935 is the fact that prices on both rubber and cotton are bound to increase. Most of them have already purchased their requirements, or a good portion of them for the new year. Therefore, they are in an excellent position concerning raw materials. This, of course, is an advantage not realized by the smaller concerns.

Still another point made by leaders is the position of the dealer in the industry. Stocks of tires and tubes in the hands of dealers and mass distributors on October 1, 1934, the end of the active tire season, amounted to more than 1,000,000 less than they did on April 1, the normal beginning of the season. Their average holdings, according to the Department of Commerce, were 63.8 tires per dealer, a decline of 15.9 tires from April.

With regard to increased replacement sales in 1935 William O'Neil, president of the General Tire & Rubber Company points out that "tires on one out of every three cars now being driven in the country are economically unserviceable and should be replaced." He also stated that tires will be worn out faster by the new cars because "motor-car wheel diameters are getting smaller and smaller" and that means that "tires will be worn out faster for the wheels will go around more rapidly and more often in a given distance."

Conditions Now Reversed

Mr. O'Neil also points out that for the past six years material prices declined steadily and tire prices went down with them. Both manufacturers and dealers tried frantically to move the tires, made with high-priced rubber, they had in stock. Price wars developed, prices were further slashed, and profits practically eliminated. "Conditions are now reversed," says Mr. O'Neil, "Tires that are being sold today cannot be replaced at their present costs . . . With prices rising wise car-owners are going to buy the very best tires they can get because it will probably be impossible to replace tires bought today with similar tires at the same price . . . A car owner can no longer wait for the next price change. If he waits, he loses."

Tire Sales Prediction

According to J. W. O'Meara, assistant general sales manager, R. L. Polk & Company, the automobile industry will buy approximately $125,000,000 worth of tires and tubes from the rubber industry as original equipment for 1935 cars. In 1933 the motor industry purchased $75,000,000 worth of tires and tubes as original equipment. The prediction for 1935 is based on the steadily rising market prices on tires, combined with substantial increases of motor car sales visualized for the current year. Production of automobiles in 1935 is estimated to be 3,500,000 including trucks.

Expressing the belief that business activity is now going ahead and upward at a more moderate and healthy rate than experienced in 1933, Paul W. Litchfield, president, Goodyear Tire & Rubber Company in a statement issued recently, brings out the fact that "registrations of motor cars in 1934 were 7% over the previous year, which is the first time in several years that registrations have been on the increase." Truck registrations, too, increased in 1934, there being 27% more registrations than in the preceding year.

Government Policies

Mr. Litchfield expressed some concern over three factors responsible for continued business hesitation. He defined these as being uncertainty as to various governmental policies, the threat of labor troubles and high costs obtaining in the dormant building industry.

It is interesting to note that the tire industry contributed liberally to the annual Federal, State and Municipal tax bills. The Federal excise tax, alone, has cost the industry more than $47,000,000 in the past twenty-six months which is almost equivalent to 10% of the total sales value of tires and tubes in that period.

Naturally, a good deal of the enthusiasm expressed by rubber manufacturers is based on the equally enthusiastic feeling existing among automobile manufacturers. With 1934 production exceeding the fondest expectations and estimates made early in the year, the leaders of that industry foresee an additional upward swing in 1935.

The opening of the automobile show in New York City on January 5, where practically every line of cars was on exhibition, heightened such enthusiasm since early reports stated that orders from dealers were highly encouraging. And the fact that the 1935 cars make liberal use of rubber in several new applications is a welcome note to manufacturers of automotive rubber goods.

ORDER REORGANIZATION OF KELLY-SPRINGFIELD

Liquidation and reorganization of the Kelly-Springfield Tire Company, of New York, was ordered on December 21 by Vice-Chancellor Charles M. Egan of Trenton, N. J. This action was taken by the court on the grounds that if the losses of about $20,000,000 sustained by the company in the last six years were allowed to continue the entire assets would soon be dissipated.

Kelly-Springfield, which maintains a factory at Cumberland, Maryland, and which has been manufacturing tires since 1894, was placed in a chancery receivership on December 18 by Vice-Chancellor Egan. The company is a New Jersey corporation.

Action for receivership was started by three stockholders who petitioned the New Jersey courts on November 9 alleging that stockholders' investments were endangered on the evidence that assets had shrunk from $30,724,000 in 1928 to $9,629,615 in June of 1934. Under the New Jersey Corporation Act reorganization is permitted to protect the public, such evidence being deemed sufficiently conclusive for the courts to act.

The receivership was granted by Vice-Chancellor Egan over the protests of counsel for stockholders who had been opposing the present Kelly-Springfield management. This group joined hands with the management in this respect but to no avail. Immediately following the announcement of receivership the Kelly-Springfield counsel issued a statement declaring that the company is in a "firm financial position, its current assets being of a ratio more than 12 to 1 over liabilities." He also stated that the receivership was granted "not because of insolvency but because of losses in the last few years."

Receivers appointed by the court, three in all, include Edmund S. Burke, president of the company; Daniel T. O'Regan, Hudson County Prosecutor; and John P. Maguire, president, Textile Banking Corp. The Kelly-Springfield business is to be continued until such time as a sound reorganization can be worked out, according to Scott McLanahan, company counsel.

In an attempt to prevent distribution of the company's assets by the receivers appointed by the New Jersey court, the Janrey Corporation, owner of 1,500 shares of common stock, filed suit in Federal Court, New York City, requesting the appointment of an equity receiver. The new suit specifically seeks the legal right for all stockholders and creditors to be allowed to join the action and that the company be enjoined from disposing of any of its assets.

In addition to quoting the extravagant losses suffered by Kelly-Springfield since 1928, which was introduced by the three stockholders in their suit resulting in receivership, the new complaint alleges that losses in 1934 up to October were more than $784,000.

Rubber Technology Course

A course in rubber technology covering the production, properties and industrial stabilization of rubber, with particular attention to the principles of milling, compounding and testing, was started on January 7 at University College, adult evening division of the University of Southern California, Los Angeles. The course, taught by Professor Raymond B. Stringfield, will continue for 12 weeks and will include visits to several plants in the surrounding area.

New England Office

For the convenience of our readers and advertisers in New England we have opened an office at

434 New Industrial Trust Bldg.
Providence, Rhode Island
Telephone: GAspee 5281

in charge of Mr. F. Royal Carey, our New England Representative. Mr. Carey will be glad to confer with our readers and advertisers on points of mutual interest.

THE RUBBER AGE.

LABOR TROUBLES PURSUE AKRON TIRE FACTORIES

Rubber manufacturers in Akron, particularly the tire companies, are again in the midst of labor troubles. No further action has been heard with regard to the National Labor Relations Board's decision to hold elections in the factories of both Goodrich and Firestone to allow employees to select a representative union, a decision which was held up by the tire companies in requesting the Federal Circuit Court of Appeals, at Cincinnati, to review its legal status. The labor board filed an answer to the petitions of Firestone and Goodrich on December 18. To date the court has rendered no verdict.

On January 3 a committee headed by John House, president of the Goodyear local of the United Rubber Workers' union, presented a request to Clifton Slusser, Goodyear vice-president and factory manager, asking for an average hourly pay raise of 35 cents per hour, in addition to a maximum work week of 30 hours and a six-hour day, with time and a half for overtime. A flat refusal to the entire request was given by officials of the company through Mr. Slusser.

In mid-December Firestone laid off 300 workers from their battery department. Immediately thereafter the union raised the cry of "discrimination" and carried their charges to the regional labor board at Cleveland, of which Ralph Lind is chairman. Specific charges in this instance include alleged violation of Section 7-A, the union asserting that all but 50 men in the battery division were laid off while men are being hired in other divisions.

A strike threat hovers over the factory of the Seiberling Rubber Company. The union alleges that the company refuses to consider a signed agreement on wages and working conditions. The company's contention is that many of the demands made by the union are already in effect and therefore no further agreement is necessary. Several conferences have already been held between Seiberling and union officials, with Ralph Lind, regional labor director, acting as peacemaker. Union employees have already voted favorably on a strike date and it remains up to Mr. Lind to negotiate a settlement agreeable to both parties involved, to avoid a strike.

Russia Has Synthetic Latex

The All-Union Rubber Research Institute, of Russia, has succeeded in producing synthetic latex by butadiene polymerization in the form of aqueous emulsions, according to a report by Joseph Wassermann, of Moscow, in the December 20 News Edition of *Industrial and Engineering Chemistry*.

NOVEMBER CONSUMPTION 11.1% ABOVE OCTOBER

Consumption of crude rubber by manufacturers in the United States for the month of November amounted to 34,842 long tons, which compares with 31,347 long tons for October. November consumption shows an increase of 11.1% over October, and 20.8% above November a year ago, according to statistics released by The Rubber Manufacturers Association. Consumption for November (1933) was reported to be 28,831 (revised) long tons.

Imports of crude rubber for November were 36,233 long tons, an increase of 2.6% above the October figure of 35,298 long tons, but was 14.6% below 42,448 long tons imported in November, 1933.

Total domestic stocks of crude rubber on hand November 30th were 361,236 long tons, which compares with October 31st stocks of 362,018 long tons. November 30th stocks show practically no change as compared with October 31st stocks, but were 1% above stocks of November 30, 1933.

The participants in the statistical compilation report 38,625 long tons of crude rubber afloat for United States ports on November 30th compared with 38,247 long tons afloat on October 31st, this year, and 57,140 long tons afloat on November 30, 1933.

November reclaimed rubber consumption is estimated to be 7,775 long tons; production 7,268 long tons; stocks on hand, November 30th, 23,999 long tons.

Hold R.M.A. Meeting

Members of the Rubber Manufacturers Association convened at the Hotel Waldorf-Astoria, in New York City, on January 7. The financial report was rendered and approved, as was the tentative budget for 1935. All members of the Board of Directors were re-elected at the regular session. Following the regular meeting the Board of Directors held a short meeting and re-elected all incumbent officers of the Association. There was very little business transacted, the meeting being defined as routine.

Propose Factory in Brazil

The Federal Trade Council of Brazil has under consideration a proposal made by a German organization to install a modern rubber manufacturing factory in the State of Para. The German concern has expressed a willingness to accept crude rubber as payment in full for the installation. The proposal is said to being given serious thought since the Brazilian government is trying to find new ways to develop the Amazon rubber trade. The German concern is said to be interested in the installation of the factory only, not wishing to exploit the finished product.

Van Cleef Names Agents

Van Cleef Bros., Chicago, has appointed the Service Sales Corporation, of Boston, to represent the company in the New England territory, on their Dutch Brand rubber and chemical products. For the convenience of customers the new agents will carry a complete stock of products at its Boston warehouse.

LOOKING FOR A JOB
See Classified Ads—Page 209

CHAOTIC CONDITIONS IN CHINESE RUBBER MARKET

A recent letter to W. B. Weigand, technical director of the Binney & Smith Company, from Shanghai, reveals chaotic conditions existing in the rubber industry throughout the Chinese Empire. Out of a total of 37 rubber shoe factories which functioned in Shanghai, the rubber center of China, 25 have been liquidated within recent weeks. The direct cause of the bankruptcy of these rubber shoe manufacturers is said to be the constant dumping of Japanese rubber goods into the China market.

A dozen pairs of rubber shoes, produced by Chinese manufacturers are ordinarily sold for approximately $12.00 the dozen. Japanese-dumped rubber shoes bring a price of approximately $6.00 per dozen.

According to Mr. Yang Yung-Nien, chairman of the Shanghai Rubber Dealers' Association, the industrial rubber business in China is declining at a rapid rate without the slightest prospect of recovery in the near future. He revealed that the Chinese rubber industry was first dominated by the United States and later by Japan. Subsequently, the Chinese, by sheer energy and perseverance, gained the ascendancy. The influx of Japanese-dumped rubber goods has now practically obliterated that ascendancy and has produced the chaotic conditions described.

Another interesting item revealed by the Shanghai correspondent, is that many Chinese have been engaged in rubber plantation work in the South Seas. They were very successful in their operations, particularly the firm of Chen Chia Keng, for many years one of the most prosperous rubber firms in the Far East.

Japanese competition is more keenly felt because of the frequent transporting of Japanese rubber goods into China proper through Manchuria without the payment of duty. The whole of China, particularly North China, has become a dumping ground for such goods.

Leaders in China rubber circles have expressed the belief that unless financial assistance is afforded by the national government it would be a matter of time before the Chinese rubber industry will be completely crushed.

The remaining rubber manufacturers are said to be in existence because of reserve funds and are not showing any profits. Even the China Industrial and Commercial Rubber Factory, which produced rubber shoes to sell at $15.00 per dozen, against a production cost of $12.00 per dozen, has been forced to shut down.

RUBBER COMPANIES SEEK BAN ON JAPANESE TOYS

Rubber manufacturers are up in arms against the constantly increasing influx of Japanese-made rubber toys and novelties. The protest has grown into a nation-wide fight with the Sun Rubber Company and the Seiberling Latex Products Company, both of Barberton, Ohio, leading the way. The Barberton, Akron and Ohio Chambers of Commerce have declared an open boycott against goods produced in Japan, and are enlisting the sympathies and active support of chambers of commerce throughout the country.

Congressman Dow Harter, of Ohio, filed a vigorous protest against Japanese competition to the White House in Washington on December 14. He submitted figures showing that the Sun Rubber Company, as an example, in the division making products thrown into competition with Japanese-made goods, had 445 employes on November 11, 1933, with the payroll for two weeks preceding that date set at $15,414.72. Employes in the same division at the end of a two-week period on November 10, 1934, numbered only 196, with a $7,608.48 payroll.

The claim of the rubber companies further states that each time American manufacturers produce a new or novel toy, other nations, principally Japan, flood the country "with cheaper, but inferior copies." Congressman Harter requested that the tariff commission be ordered to investigate these complaints under a section of the industrial recovery act which provides for remedies in cases where costs under NRA codes make it more difficult for American manufacturers to compete with foreign products.

H. D. Gresham, chief of the import division of the NRA, in answer to the request for administrative action replied in letter form that no formal petition of protest had been filed by rubber sundry manufacturers requesting action against Japanese competition. In answer to this Congressman Harter accused the NRA with "buck passing." At last reports he was endeavoring to get President Roosevelt, personally, to order the tariff commission to make the investigation originally requested.

Enjoin Goodyear Slicker Co.

A permanent injunction was entered in the United States District Court, Eastern District of Pennsylvania, at Philadelphia, on December 18, permanently enjoining Abraham Sonstein, doing business as the Goodyear Slicker Company, with headquarters in Philadelphia, for violations of the provisions of the Rubber Manufacturing Code. Violations charged included hours, wages, failing to file reports and use of labels. The injunction degree was entered by consent of the company.

TIRE SHIPMENTS DROP 5.4% BELOW SEPTEMBER

Shipments of pneumatic casings for the month of October amounted to 3,009,714 casings, a decrease of 5.4% below September this year, but were 18.6% above October (1933), according to statistics released by The Rubber Manufacturers Association, Inc.

Production of pneumatic casings for October were 3,286,902 casings, an increase of 12.0% over September, but was 4.1% under October, 1933.

Pneumatic casings in the hands of manufacturers on October 31st amounted to 8,656,799 units, an increase of 2.8% above stocks on hand September 30, 1934, and were 2.3% above stocks October 31, 1933.

The actual figures are as follows:

PNEUMATIC CASINGS

		Shipments	*Production*	*Inventory*
Oct.,	1934	3,009,714	3,286,902	8,656,799
Sept.,	1934	3,182,903	2,935,958	8,418,906
Oct.,	1933	2,536,971	3,428,658	8,461,735

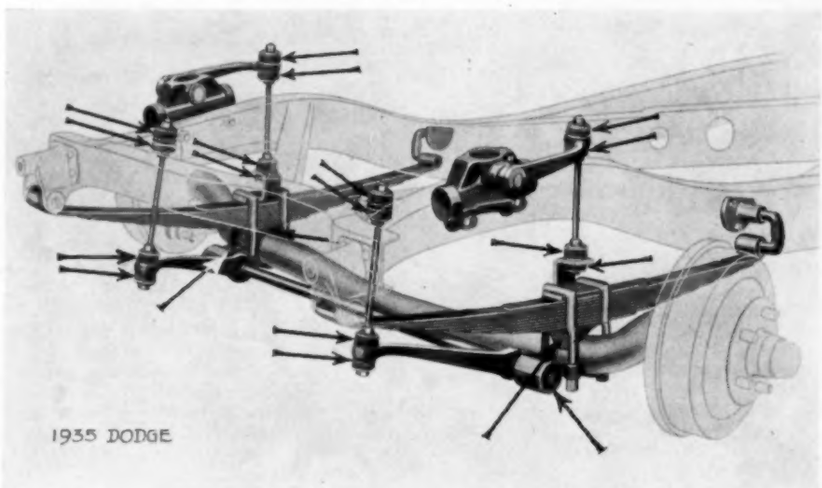
Shoe Dealers Hold Convention

Approximately 10,000 shoe dealers, from all parts of the country, attended the National Shoe Retailers' Convention, held at the Hotel Commodore in New York City, the week of January 6. More than 400 different lines of shoes were on exhibition. Convention meetings revealed that the 1934 shoe consumption was almost 6% above that for 1933.

Plan Cooperative Buying

In order to combat competition from mass distributors, such as mail order houses and oil companies, group buying will soon be attempted among independent tire dealers, according to George J. Erlinger, president, National Tire & Battery Association. The announcement was made shortly after a meeting of directors of the Association held in Chicago late in October.

1935 DODGE FRONT SUSPENSION MAKES USE OF RUBBER



The arrows in the above sketch indicate rubber applications

In the November, 1934, issue of THE RUBBER AGE was reproduced a diagramatic sketch of the 1934 Dodge showing the liberal use of rubber made throughout the chassis of the car. Above is pictured the "Synchromatic" front suspension of the 1935 Dodge, just introduced, which in itself uses rubber at 20 separate points as indicated by the arrows. The constantly increasing use of rubber in automobile manufacture is responsible for smoother riding cars. The next big step to be taken by the manufacturers involves the use of rubber upholstery.

Financial News

LEE RUBBER NET INCOME FOR YEAR IS $326,869.98

Lee Rubber & Tire Corporation, Conshohocken, Pennsylvania, in its nineteenth annual report for the fiscal year ended October 31, 1934, shows net profits of $326,869.98, after expenses, depreciation, taxes, and other charges were deducted. This is equal to $1.28 per share on the 254,465 shares of stock. At the end of the previous fiscal year stocks earned only $1.01 a share on the 258,965 shares of stock then outstanding, based on net income of $260,607. The company has issued 300,000 shares of stock of which it now holds 45,535 shares in its treasury.

Net sales for the year, after deducting all discounts and allowances, amounted to $7,354,166.93 compared with $5,150,516 net sales in the preceding year. Net income, prior to deduction for depreciation on plants and equipment, was $507,772.14. Total current assets of the company at the end of October, 1934, was $4,168,499.84, of which $806,418.19 was in cash. Total current liabilities were set at $408,708.02.

In a summary accompanying the report John J. Watson, president, pointed out that the low price on tires which existed in 1934 held down larger profits for the company. He also stated that the company paid out more than $508,000 in Federal State, Municipal and processing taxes.

SEIBERLING LOANS ARE REFINANCED BY BANKERS

At the annual meeting of stockholders of the Seiberling Rubber Company, Akron, on Decembed 18, it was announced that an extension to November 15, 1936, had been granted by New York bankers on the company's $1,000,000 debentures. Announcement was made by F. A. Seiberling, president, who stated that the extension puts the company in a position of being "ably financed" for the next two years. Another $1,350,000 of debentures is due in November, 1935.

Annual financial statement of the company was not available at the meeting but is said to be rapidly nearing completion for early publication. All of the officers were re-elected.

During the meeting Mr. Seiberling stated that he expected 1935 to develop tire business "at a profit" for the first time in three years. He claimed the larger tire manufacturers earned profits by virtue of having "operated with cheap rubber and cotton bought far below current market levels." He also predicted another tire price increase to bring retail prices in line with increased costs.

O'SULLIVAN RUBBER CO. HAS $493,824 PROFIT

O'Sullivan Rubber Company, Inc., Winchester, Virginia, reports net profit of $493,824, after deducting taxes, depreciation, etc., for the six months ending June 30, 1934. Computed on capital stock outstanding at the close of 1933, excluding treasury shares, this profit is equal to $1.00 a share on 296,855 no-par common shares, after allowing for dividend requirements on 87,150 no-par shares of $3.00 preference stock. Last year the company reported a net loss of $114,792.

The O'Sullivan report also states that under the Federal revenue act of 1934 rates of depreciation have been revised and a portion of the provisions for depreciation has been charged against a special reserve created out of capital surplus on December 31, 1932.

Firestone Votes Dividend

Directors of the Firestone Tire & Rubbed Company, Akron, voted a quarterly dividend at 10 cents per share on the outstanding common stock, payable January 21 to stockholders of record January 4, 1935. The directors also voted the quarterly dividend of $1.50 per share on the preferred stock, payable March 1 to stockholders of record February 15, 1935.

Pay General Tire Dividend

Payment was made on December 31 by the General Tire & Rubber Company, Akron, to stockholders of record December 20, 1934, of the regular quarterly dividend of $1.50 a share on the company's 6% cumulative preferred stock, plus $1.50 a share on account of arrears, for a total of $3.00 a share.

Profit for Mid-West Rubber

Mid-West Rubber Reclaiming Company, of Akron, which is controlled by the Akron Rubber Reclaiming Company, reported net income of $70,792 for the year ending October 31, 1934. This contrasts with a net loss of $18,554 reported in the previous fiscal year.

New Valve Named "Dubltite"

A. Schrader's Son, Inc., Brooklyn, New York, has named its recently introduced rubber-covered-base metal valve "Dubltite." A contest was held by the company to select a name for this latest improvement in valves, with the first prize of $100 being awarded to W. L. Moffat, of Cincinnati. Additional prizes were also awarded.

Gigantic Blimp Ordered by Army

The United States Army has ordered the production of a new blimp from the Goodyear Tire & Rubber Company, Akron. It is said that plans for the blimp will make it the largest in the history of lighter-than-air craft. It will carry a crew of 14 men.

I. R. I. Moves London Offices

The Institution of the Rubber Industry, which for many years has had its offices at 10 Charing Cross Road, in London, has moved to 12, Whitehall, S. W. 1, that city. All communications should be addressed to the new address.

N. J. Zinc Buys Randall Co.

The New Jersey Zinc Sales Company has purchased from the estate of Ralph E. Potter, who was associated with that company for many years, the business and good-will of David Randall & Company, manufacturers' sales agents, of Boston, and will continue this business in the name of the New Jersey Zinc Sales Company. Until further notice the company will operate from the same address, (55 Kilby Street) and through the same warehouse. (the Albany Terminal Stores) with which customers are already familiar as a result of dealings with Mr. Potter and David Randall & Company in connection with their products. Mr. George W. Harragan, who, starting the early part of 1934, assisted Mr. Potter while the latter was ill, will continue as New England representative.

India Receivership Denied

The suit of two stockholders of the reorganized India Tire Company, of Akron, requesting receivership for that company on the grounds of incompetent management, filed on November 26 in the Portage County (Ohio) Common Pleas Court, at Ravenna, was thrown out of court by Judge C. H. Curtiss on December 11. After hearing arguments of counsel Judge Curtiss declared there was no cause for a receivership because the "evidence fails to show certain stocks were wrongfully issued to certain groups." He also stated "no evidence of insolvency" was introduced. W. G. Klauss, president of India Tire, recently visited Washington where he is endeavoring to secure a loan of $350,000 from the Reconstruction Finance Corporation.

Discusses Rubber Compounding

The November-December issue of *The Vanderbilt News*, house organ published by the R. T. Vanderbilt Company, New York, is devoted in entirety to the subject of rubber compounding. The issue is divided into four sections, each of which discusses another angle of compounding described as "the most important branch of rubber technology from the commercial point of view." These sections include: the Aims of Rubber Compounding, Materials for Building Compounds, the Building Up of a Rubber Compound and Electrical Properties of Rubber Compounds. Graphic charts in the issue show various effects of loading materials on tensile and modulus of vulcanized rubber.

Du Pont Acquires Krebs Co.

E. I. du Pont de Nemours & Company, Wilmington, Delaware, acquired complete control of the Krebs Pigment and Color Corporation on December 22 when arrangements were completed for that concern to purchase the 30% stock interest in the Krebs company owned by the Commercial Solvents Corporation. Prior to such arrangement the balance of stock ownership was in the hands of the Grasselli Chemical Company, a du Pont subsidiary. Payment of $7,420,000 is said to have been made to the Commercial Solvents Company. The Krebs concern manufactures dry colors, lithopone and paint pigments for the rubber, paint, lacquer, linoleum and printing ink trades. It maintains factories at Newport, Del., Newark, N. J. and Baltimore, Maryland.

Names in the News

J. P. SEIBERLING, vice-president, Seiberling Rubber Company, addressed members of the Automotive Maintenance Association of Toledo, on December 26. He urged independent merchants to organize.

O. B. WAITE, for several years purchasing agent of the Ohio Rubber Company, Willoughby, Ohio, has left that organization to assume a selling position with the Dugan & Campbell Company, of Akron.

B. M. ROBINSON, assistant secretary, Firestone Tire & Rubber Company, Akron, was elected president of the Portage (Ohio) Country Club on December 21. T. B. TOMKINSON, comptroller, B. F. Goodrich Company, Akron, was elected vice-president and treasurer.

HENRY BRESEAU, formerly associated with the Hood Rubber Company, has been appointed to the technical staff of the Vultex Corporation of America, of Cambridge, Mass.

PAGE NOLL, division supervisor, covering St. Louis, Memphis and the New Orleans territories, for the U. S. Rubber Company, has also been appointed district manager in St. Louis.

WILLIAM O'NEIL, president, General Tire & Rubber Company, Akron, predicted better business conditions "in spite of what politicians may do" for 1935 in an address to the Ohio Society of New York at the Hotel Pennsylvania, New York City, last month.

CARL BLY has been appointed advertising production manager for the Seiberling Rubber Company, Akron. He has been associated with the Goodyear, Goodrich and Mason Tire companies.

T. F. BOWEN, who has been with Goodrich since 1932, has been appointed operating manager of the Boston district, succeeding W. J. GOFF, the latter having been assigned to other duties.

R. J. COPE, president, Firestone Tire & Rubber Company of California, was a visitor in Akron last month. A dinner was given him on December 12 by Mr. and Mrs. HARVEY S. FIRESTONE, Sr.

HERBERT E. SMITH, vice-president and general manager of the Mechanical Goods Division, U. S. Rubber Company, New York, also assumed the general management of the General Products Division last month. He has been with the company for a number of years and is a member of the executive committee of the board of directors.

FRANK GABLE, chief engineer, General Tire & Rubber Company, Akron, told a gathering of General dealers and distributors in the Queen's Hotel, Montreal, Canada, on December 15, that safety is the paramount feature to be considered in the purchase of an automobile tire.

L. L. MCCLINTOCK has been appointed assistant sales manager of the Fisk Rubber Company, Chicopee Falls, Mass. He will be in charge of tire repair materials and special items including retreading activities.

Medal for Father Nieuwland

Father Julius A. Nieuwland, Professor of Organic Chemistry, of Notre Dame University, was chosen last month to receive the William H. Nichols medal of the New York section, of the American Chemical Society, for 1935. The awarding of the medal will take place next April during the 300th anniversary meeting of the founding of the American chemical industry which will be held in connection with the 89th meeting of the American Chemical Society during the week of April 22. Father Nieuwland was selected "for basic work on syntheses from unsaturated hydrocarbons." His research and development in this connection led to the development of DuPrene by the du Pont company. He is often referred to as the "father of synthetic rubber."

Hutchins Quits at Goodyear

After twenty years of constant promotions in the service of the Goodyear Tire & Rubber Company, Akron, C. T. Hutchins, who rose from office worker to advertising manager, tendered his resignation to the company on January 5. He started with the company when 14 years of age and has been associated with several branches of Goodyear. He was named advertising manager seven years ago, a post he held until his resignation. No successor to Mr. Hutchins has yet been named.

JOHN INGLE, managing director, Goodyear Orient Company, and resident manager, Goodyear Rubber Plantations Company, in Sumatra, spent his first Christmas since 1926 in the United States last month. He has served 17½ years for Goodyear in the Far East.

ROGER ADAMS, head of the Department of Chemistry of the University of Illinois, was elected president of the American Chemical Society for the coming year last month.

HARVEY S. FIRESTONE, Sr., chairman of the board, Firestone Tire & Rubber Company, Akron, celebrated his 66th birthday on December 20. He spent the day at his office as usual.

PAUL W. LITCHFIELD, president, Goodyear Tire & Rubber Company, Akron, visited Goodyear's rubber factory in Los Angeles and the company's cotton ranch at Litchfield, Arizona, last month. He predicted another increase in tire prices soon.

FRANK T. TUCKER, advertising manager, tire division, B. F. Goodrich Company, Akron, outlined the Goodrich advertising policy for 1935 to members of the Boston Advertising Club at a meeting of that organization in Boston last month.

GEORGE SACKETT, head of the research laboratory, Goodyear Tire & Rubber Company, Akron, entertained a group of boy scouts in Akron on December 17 with an illustrated lecture on "Rubber Plantation Activities."

SEEKING A RUBBER FACTORY?
See Classified Ads—Page 209.

W. RUTHERFORD RESIGNS AS PENNSYLVANIA HEAD

W. O. Rutherford, president of the Pennsylvania Rubber Company, Jeannette, Pennsylvania, for the past six and one-half years, resigned from that company on December 12. Prior to his assuming the presidency of Pennsylvania Rubber he was vice-president of the B. F. Goodrich Company for many years.

During Mr. Rutherford's incumbency he revised the entire policies of the company. Under his regime it showed annual profits for the past six years. He brought to the company not only his experience at Goodrich but also knowledge absorbed as president of the Rubber Manufacturers Association, which post he occupied for three years, as president of the Motor and Equipment Manufacturers Association, and as a member of the Pan-American Highways committee.

To date Mr. Rutherford has made no announcement concerning his future activities, but is continuing temporarily to reside at his Greensburg, Penna., home.

Hold N. Y. Automobile Show

Twenty-eight makes of passenger cars, including three of foreign manufacture, were on exhibit at the 35th Annual Automobile Show, held at the Grand Central Palace, in New York City, the week of January 5 to 12. More than 50 accessory exhibits, ranging from pilot lights to luxurious trunk racks, were on view. Many of the 1935 automobile models on exhibit use the new type of front spring suspension which makes liberal use of rubber in several applications. An illustrated view of this suspension in the Dodge models is seen elsewhere in this issue.

Retailers to Revive Code

Independent tire dealers' associations are making a combined effort to revive the retail tire code authority, which has been dormant for the past three months since the National Tire Dealers' Association was thwarted in its attempt to raise funds to finance enforcement of the code. A group of association representatives met in Chicago on December 19 to formulate plans to finance such enforcement by assessing dealers on the volume of business done, and to prosecute violators of retail code trade practice restrictions. Hardy C. Carr is deputy administrator of the retail tire code.

NEW ENGLAND NEWS

A. J. Donahue Corp., Milford, Conn., has purchased the Union Specialty Company, Bridgeport, manufacturing garters and other elastic goods, and will continue operation of the plant at 74 Oak street, Bridgeport. Joseph Jacobs, president, and John T. Stevens, sales manager, will be in charge of the plant.

United States Rubber Products, Inc., Naugatuck, Conn. will continue to operate its plants on a five-day week basis during the first three months of 1935, according to Walter H. Norton, factory manager. The plants closed down from December 21 to 26 in order to allow employes to spend Christmas at former homes in other cities. Mr. Norton's announcement pointed out that waterproof schedules for the first three months would depend largely upon the weather, while full time production on tennis and bathing shoes is anticipated.

Naugatuck Chemical Company, Naugatuck, Conn., has started construction of additions to its plant which will cost in the neighborhood of $11,000. Part of the project is a one-story building of concrete, which will be arranged to carry additional stories at a later date.

Canfield Rubber Company, Bridgeport, Conn., is building a small addition to its plant at 708 Railroad avenue, at an estimated cost of about $3,000.

Several Southern New England rubber manufacturing companies staged Christmas parties for their employes during the recent holiday season. The Armstrong Rubber Company, West Haven, Conn., presented each of the 300 employes a Christmas basket, including a turkey and other food items. The Sponge Rubber Products Company, Derby, Conn., staged a Christmas party and dinner on December 22 at the plant. The annual party of the Seamless Rubber Company, New Haven, was held December 18 at the New Haven Lawn Club, with Thomas Gibbons, sales manager, as toastmaster, and President F. Thatcher Lane as principal speaker.

GOODYEAR DEFENSE ENDS ON ANTI-TRUST CHARGES

After hearings held in many cities attorneys for the Goodyear Tire & Rubber Company rested their defense on December 11 in Akron completing the first step in a lengthy suit brought on January 15, 1934 by the Federal Trade Commission charging Goodyear with violation of the Clayton anti-trust act in relation to its contracts with Sears, Roebuck & Company. Several volumes of testimony have been filled in the past twelve months including that of dozens of dealers introduced by Goodyear.

The Federal Trade Commission's attorneys started their rebuttals of Goodyear testimony in New York City on December 13 where hearings were held until the Christmas holidays when a recess was taken. Hearings moved back to Akron on January 3 where government attorneys are continuing their rebuttals.

One of the more important witnesses introduced by the government during the New York hearings was Dr. Edmund Learned, associate professor of marketing at Harvard University, who was on the stand for several days. He was used by the federal attorneys in an attempt to contradict the testimony of Goodyear witnesses who testified that the elaborately prepared "margin sheets" should be used in showing price differentials of tires made for tire dealers and Sears-Roebuck stores. Dr. Learned testified that the Goodyear profit and loss statement is superior to the "margin sheets," a contention held by the commission's attorneys.

In the November, 1934, issue of THE RUBBER AGE we reproduced a table, introduced by Goodyear in its defense, which showed the annual tire sales of several tire manufacturers and distributors for the years 1926-1933. For the years 1928, 1929 and 1930 we quoted complete production including original equipment sales made by the Firestone Tire & Rubber Company as being 5,849,269, 5,176,284 and 5,528,806 respectively. These figures should read as follows: 1928—6,622,665; 1929—5,849,229; and 1930—5,176,284.

Taxes Average 47.9c Per Tire

A recent report of the Department of Commerce reveals that Federal excise taxes of 2¼ cents per pound upon tires and 4 cents a pound on inner tubes represent an average sales tax of 47.9 cents per tire and 10.6 cents per inner tube based on 1933 figures. Total taxes amounted to $25,000,000 or about 10% of the total value of tires and tubes produced in 1933. The average tire weighed 21.3 pounds, the average inner tube 2.65 pounds. Approximately 60% of the revenue from these taxes came from Ohio. Michigan, California and New York were second, third and fourth respectively, in tire and tube production, based on tax figures.

Organize New Jacoby Firm

Following the death of Ernest Jacoby, crude rubber broker of Boston, Mass., his two sons, Ernest, Jr. and Francis, both of whom have been associated with the firm for several years, together with Richard Baybertt, who was associated with the deceased Mr. Jacoby for the past twenty years, have formed the firm of Ernest Jacoby and Company, and will continue to operate the business. The new company is located at the same address as heretofore, 79 Milk Street in Boston.

Schulman Leases Warehouse

Due to crowded space in their Akron warehouse, A. Schulman, Inc., dealers in crude and scrap rubber and hard rubber dust, have leased a larger warehouse at 575-77 South High St., for the handling of its large stock of rubber. Stocks are shipped from the new warehouse to all parts of the country. Offices and a warehouse are also maintained in E. St. Louis, Ill.

TIRE CHOICE INDICATED BY CAR DEALER SURVEY

A recent survey conducted by a trade publication in the automotive field on the volume of tire business conducted by car dealers and independent shops, exclusive of the business done through oil stations, tire dealers and other regular primary channels, reveals some interesting data relative to such sales.

Of the group responding to the questionnaire involved in the survey 84% handle tires, selling an average of 19 casings per outlet, per month, and selling an average of 24 inner tubes per month. These car dealers stock an average of 63 tires and 79 tubes each. Based on previous figures the quantity of tires stocked has grown steadily and is approaching the national average of straight tire dealers.

These car dealer outlets accomplish their buying in the following percentages: 62% from factory branches, 30% from jobbers, 16% from tire distributors, and 8% from tire factories. Practically all of the 84% handling tires also handle tire valves, patches, and similar materials.

In the matter of tire preference the order was as follows: (according to the survey) —Goodyear, Firestone, Goodrich, United States, Fisk, Gates, National, General, Seiberling and Armstrong. Inner tube preference was almost identical with exceptions being noted in the last five positions of the 10 preferences indicated by the car dealers.

TRENTON NEWS

The Rubber Manufacturers' Association of New Jersey held its annual meeting and dinner on December 18 at the Trenton Club. The following officers were re-elected: President, John A. Lambert, Acme Rubber Mfg. Company; Vice President, Lloyd R. Leaver, the Thermoid Company; Secretary, Charles E. Stokes, Jr., Home Rubber Company; Treasurer, Horace B. Tobin, Woven Steel Hose & Rubber Company.

The Dural Rubber Corporation, Flemington, N. J., has reopened its plant after having been closed for several weeks. Only half of the force has been given employment and the remainder will be taken back shortly. The company announces that it will resume the manufacture of inner tubes. J. A. MacEwan, formerly associated with the Rubber Products Corp., Doylestown, Pa., has been made production manager of the company.

The Duryea Products Company, of Bayonne, N. J., manufacturers of machine belts, has leased a portion of the Eureka Rubber Company plant in Jersey City, N. J.

The Franklin Rubber Corp., Doylestown, Pa., which took over the plant of the Rubber Products Corp., last July is now operating six days a week with a full force of sixteen men. The concern manufactures various kinds of plumbing supplies.

George S. Fabel, president of the Southern Asbestos Company, and associated with the Thermoid Company, Trenton, N. J., has purchased a large farm near Trenton and will move there with his family from the South.

NEW YORK RUBBER GROUP HOLDS ITS ANNUAL PARTY

The annual meeting and Christmas party of the New York Rubber Group was held, as outlined in our previous issue, on December 14 at the Building Trades Employers Association club rooms, 2 Park Avenue, in New York. After the usual excellent dinner an amusing and interpretative oration was made by Hugh Herndon, now associated with the Cities Service Company. Mr. Herndon is internationally-known for his exploit in flying across the Pacific with Clyde Pangborn some few years back. Steering away from the technical angle he discussed the trials and tribulations of round-the-world fliers.

Following Mr. Herndon was Dr. Ernst A. Hauser, chief chemist of the Semperit Austro-American Rubber Works, of Vienna, who is in this country on an extended visit. Dr. Hauser, who has recently authored a book covering the complete range of rubber technology, spoke on the improvements made in the use of latex, and predicted still further uses in the next few years. He discussed the need for the standardization of tests on latex compounds, and exhibited several interesting novelties made from them. He urged the advancement of research in this direction. An abstract of his discussions will be found in our previous issue.

After Dr. Hauser's address the distribution of prizes to holders of lucky numbers, in accordance with the annual ritual, was begun. Prizes ranged from flashlights to a live pig donated by Dave Scott. A modern radio receiver was another valuable prize. Table favors, in the form of ash trays and playing cards, were given each diner.

In addition to the list of companies contributing cash and prizes contained in our previous issue, should be added both the Pequanoc Rubber Company and H. Muehlstein & Company.

BOSTON GROUP HEARS PAPER ON CAST RUBBER

The meeting of the Boston Rubber Group, held on January 7 at the University Club in Boston, brought out an attendance of 135 members and guests to hear Dr. Ernst A. Hauser, chief chemist of the Semperit Austro-American Rubber Works of Vienna, give an illuminating talk on "Casting Rubber Goods." Samples of rubber products made by the latex processes described by Dr. Hauser were shown.

Latex applications, until recently, had been limited to two lines, e.g., dipping and spreading, according to the speaker. The use of latex does not indicate a substituting for crude rubber since the crude variety cannot be used to produce articles of the same quality or kind as latex.

Describing the use of latex for "casting" toys and balls, Dr. Hauser referred to a patent of Fordyce Jones issued a number of years ago in which rubber cements were used in an attempt to produce thin molded goods. Latex, on the other hand, can be used for this purpose with shrinkage adequately provided for and the manufacture of a rubber ball was used as an illustration of the method used for casting rubber products.

In brief, the process is as follows: The compounded latex is gradually poured into a two-section mold while the mold is rotated in all directions. The latex coagulates on the outside and takes the exact shape of the mold. After the proper thickness is acquired the ball is removed and dried. It is then a finished product, a seamless ball, with only surface painting required to complete the operation. Even a soft rubber sealing plug may be dropped into the mold prior to the pouring of the latex, if it is desired to increase the pressure later. The plug will adhere to a wall of the ball after a sufficient thickness has been built up.

This method is used in making hollow toys, such as dogs, chickens, fish, etc., as well as rubber boots, bathing shoes and similar products, with slight modifications. These products, when cured in hot air, do not change their shape from that imparted by the mold even if they are distorted in removal. Ebonite products can also be made by this method.

Stating that "latex is a typical material for home industries," Dr. Hauser warned those responsible for future rubber developments in this country to keep abreast of "cast rubber" production methods because the application of latex will encourage outsiders or outside industries to enter the field, even with limited capital, since there is no necessity of write-offs for heavy machinery, and these outsiders will absorb the available business.

In concluding his address Dr. Hauser urged an intelligent study of the applications of latex in casting rubber goods using methods and ideas similar to those used in metallurgy and with a colloidal knowledge of latex solutions. As a fundamental necessity he urged those interested in latex to carefully study the colloidal nature of this "white gold," predicting important discoveries in latex chemistry in the next few years.

RHODE ISLAND CLUB HAS ITS MID-WINTER MEETING

The mid-winter meeting of the Rhode Island Rubber Club was held on January 9, at the Narragansett Hotel in Providence. Approximately 95 members and guests attended. Prior to the dinner a bowling match was held with high team honors going to the team representing Respro, Inc.

Dr. Ernst A. Hauser was the only speaker, discussing "Latex and the Rubber Industry." He described various casting processes claiming that molded goods made directly from latex are opening new fields not possible with existing processes. Paying tribute to the pioneers in latex development he told of the rapid developments in recent years.

Stating that latex products can be manufactured at a lower cost than other rubber goods the speaker pointed out the ease of operation, simplicity of process and economies of initial equipment. He compared the latex obtained from Brazil with that from plantations stating that one of the most important problems is to secure a quality of latex from the latter equal to that from Brazilian trees. Concluding his remarks Dr. Hauser stated that the rubber industry is fast becoming a chemical industry.

A number of door prizes were distributed through the cooperation of the following firms: Anaconda Zinc Oxide Co., Du Pont, Halowax Corp., Naugatuck Chemical Co., N. J. Zinc Co., Pequanoc Rubber Co., Respro, Inc., Rubber Service Labs., U. S. Rubber Reclaiming Co., R. T. Vanderbilt Co., Vultex Chemical Co., and L. G. Whittemore.

CHICAGO RUBBER GROUP HAS FIRST XMAS PARTY

The Chicago Rubber Group held its first annual Christmas party at the Hotel Sherman on Friday, December 14. Dinner was served in the College Inn of the hotel with entertainment furnished by George Olsen and his orchestra. Additional entertainment was also furnished. As scheduled, the only speaker of the evening was William B. Weigand, of the Binney & Smith Company, who gave an illustrated lecture on the various points of interest he visited in the Far East recently.

This meeting was held in the spirit of a Christmas Surprise Party and surprises were many and varied. The festival spirit was made possible by the generous contributions of the following organizations:

L. Albert & Sons, American Mineral Spirits Co., American Zinc Sales Co., Anaconda Zinc Oxide Dept., Barrett Co., Godfrey L. Cabot, Inc., E. W. Colledge, Columbia Alkali Co., Commerce Petroleum Co., E. I. duPont de Nemours & Co., General Atlas Carbon Co., C. P. Hall Co., J. M. Huber, Inc., Imperial Color Co., Midwest Rubber Reclaiming Co., H. Muehlstein & Co., N. J. Zinc Co., Philadelphia Rubber Works Co., Rubber Service Laboratories Co., A. Schulman & Co., Stamford Rubber Supply Co., United Carbon Co., U. S. Industrial Alcohol Co., U. S. Rubber Reclaiming Co., R. T. Vanderbilt Co., Wishnick-Tumpeer, Inc., Allen B. Wrisley Co., Xylos Rubber Co., and the Binney & Smith Company.

Hauser at M.I.T. and Harvard

In addition to addressing the Boston and Rhode Island rubber groups last week, Dr. Ernst A. Hauser was scheduled to give a talk on "Colloidal Microscopy" at the Massachusetts Institute of Technology on Friday, January 11 and a talk on "Rubber" at the Harvard Business School on Tuesday, January 15.

Fire Damages Kleinert Plant

One of the ten buildings in the plant of the I. B. Kleinert Rubber Company, located in Astoria, Long Island, New York, was badly damaged by fire, the origin of which has not been determined, on January 2. Damage was estimated at $100,000. Although the flames, which raged for three hours before being brought under control, were confined to the curing rooms, machinery in several other parts of the building was damaged by water. The loss was covered by insurance.

Aetna Returns to Cleveland

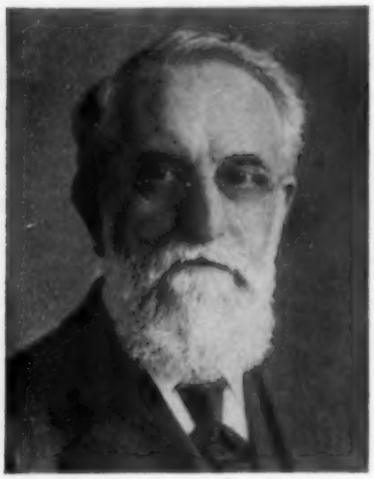
The Aetna Rubber Company, which moved its operations from Cleveland, Ohio, to Ashtabula, early in 1934, has reopened its former factory in Cleveland. The reopened factory is located at 815 E. 79 Street. According to S. P. Campbell, president, the entire plant will again be in operation by March 1. The company employs 300 men in the manufacture of rubber goods for the auto, drug and mechanical goods industries. The usual holiday shut-down was eliminated last month because of increased business.

WANT A REPRESENTATIVE?
See Classified Ads—Page 209.

Obituaries

Vernon Royle

Vernon Royle, president, John Royle & Sons, Paterson, New Jersey, died on December 17 at his home at 618 East 28th Street, in Paterson, at the age of eighty-eight. Death was due to pneumonia. A life-long resident of the city Mr. Royle



occupied the post of president and treasurer of the company, founded by his father, for the past 49 years. He was the holder of more than 150 machinery patents many of which pertain to the rubber industry, particularly tubing machines. Other industries that have benefited from these inventions include that of electrical insulation, textile, fire-hose weaving and photo-engraving.

Mr. Royle was born on June 9, 1846. His early education was acquired in the "pay schools" of Paterson. In 1877 he joined his father in the manufacture of machinery and was active in that business up to the time of his death. The business was a partnership until 1898 when it was incorporated under the name of John Royle & Sons.

Mr. Royle's contribution to progress in rubber manufacturing took form in the many patents he obtained on tubing and straining machines as well as wire insulating equipment. Royle tubing machines are used today for tire treads, tubes, tubing, hose, pencil tips, rubber heels and hundreds of other articles in soft and hard rubber and celluloid in many of the leading factories here and abroad. One of the most important machines invented and manufactured by the Royle company for the rubber industry is that for applying rubber insulation on electric wire and cable, a single machine of this type being sufficient to insulate miles of electric wire in one hour. Mr. Royle also developed a unique panning machine for insulated wire.

For twenty-five years Mr. Royle was a director of the Hamilton Trust Company of Paterson. He was a director of the Cedar Lawn Cemetery, a member of the American Society of Mechanical Engineers, a Knight Templar, a member of the Hamilton Club, and was active in several other national and community organizations.

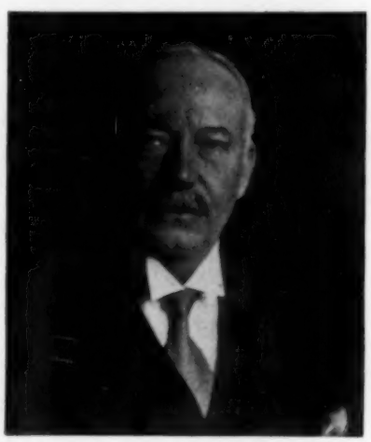
Mr. Royle is survived by his son, Vernon E., associated with the company, three grandchildren and two great-grandchildren. Burial was held from his home on Thursday, December 20.

Edwin Binney

Edwin Binney, president, Binney & Smith Company, New York, died suddenly of a heart attack in Gainesville, Florida, on December 17. He was sixty-nine years old. Mr. Binney, who had a winter home at Fort Pierce, Florida, and a home in Old Greenwich, Conn., was visiting a grandson at the University of Florida when stricken.

Born at Scrub Oak, Westchester County, New York, on November 24, 1866, Mr. Binney spent his boyhood in Peekskill. After a brief schooling in Peekskill and in Harlem he went to work for a carbon manufacturing concern. At the age of 17 he went on the road as salesman for a paint manufacturer, opening a branch office for the concern in New York City shortly thereafter. Then, with a cousin, he organized the firm of Binney & Smith, in New York City, of which he was president until his death. The company today is one of the larger suppliers of carbon black, crayons, and other materials for the rubber industry, with world-wide distribution for its products.

Several years ago Mr. Binney purchased 12 acres of swamp land in Old Greenwich, Conn., and developed it into a beautiful lake and park, later presenting it to the town as a gift. In his honor it was named Binney Park and an inscribed monument has been erected acknowledging the gift. He is also credited with the development of the "channel process" used in the manufacture of carbon black. Another achievement was the development and manufacture of motor boats many of which were noted for their speed and grace.



Companies, other than Binney & Smith, with which Mr. Binney was associated in an official or directorial capacity include: Columbian Carbon Co., Sebs Chemical Co., Coltexo Co., Southern Carbon Co., Southern Gas Lines, Inc., Western Carbon Co., and Peerless Carbon Black Co. He was a member of the Sons of the American Revolution, Riverside (Conn.) Yacht Club, Congressional Country Club, and others.

Surviving Mr. Binney are his widow and three daughters.

Thomas Midgley

Thomas Midgley, one of the earliest inventors of removable rims, died in Bradenton, Florida, his winter home, on December 26. He was 74 years old. A native of England Mr. Midgley came to this country when a child and started his career in Worcester, Massachusetts. He soon turned to the inventive field devoting his efforts to the bicycle industry, turning his talents to the automobile field shortly thereafter. He founded his own company in Columbus, Ohio, which was later absorbed by the U. S. Rubber Company, with which concern he was prominently identified for many years, acting as president of the Hartford Rubber Works, a subsidiary.

For the last twenty-five years Mr. Midgley had devoted his work to research chiefly for the U. S. Rubber and Fisk Rubber companies. He retired from the latter concern in 1927. His last few years were spent in close association with his son, Thomas Midgley, Jr., inventor of ethyl gasoline, who is in charge of other developments at the General Motors Laboratory in Dayton, Ohio. The younger Mr. Midgley is chairman of the board of the American Chemical Society.

Jarvis Starr McCrea

Jarvis Starr McCrea, assistant sales manager, carbon black department of the Binney & Smith Company, died at the Greenwich Hospital, in Greenwich, Conn., on December 25. Death was due to a hemorrhage of the liver. He had been confined to the hospital for six weeks prior to his death. Born in Buffalo, New York, in 1882, Mr. McCrea received his schooling in the Buffalo public schools. He was associated with the Lehigh Valley Railroad until the war in which he served as captain of aviation for the embarkation service in New York. He joined the Binney & Smith Company in May, 1923, with which company he was connected up until his death. He leaves a widow and brother.

Walter B. Ohl

Walter B. Ohl, a former executive of the Republic Rubber Company, Youngstown, Ohio, with which company he was associated for eighteen years, died suddenly at his home in Youngstown on December 23. Death was attributed to heart trouble. For the past six years Mr. Ohl acted as comptroller for the Republic Steel Corporation. He was born in Pittsburgh in August, 1874. Joining the Republic Rubber Company in 1906 he remained with that concern until 1924 when he left to serve as general auditor for the Trumbull Steel Company. Burial was held in Canfield Cemetery, Youngstown. He leaves a wife, daughter and sister.

Francis C. Dilzer

Francis C. Dilzer, associated with both the American Hard Rubber and Hardman Rubber companies for a number of years, died at the age of 66 on December 26 at his home in Belleville, N. J. He is credited with perfecting a number of processes for the manufacture of hard rubber products. Until his retirement several years ago Mr. Dilzer spent most of his time as a technical hard rubber expert and as a consultant on the installation of hard rubber manufacturing machinery.

David Rees Bowen

David Rees Bowen, vice-president of Farrel-Birmingham Company, Inc., and for forty-five years its chief engineer, died at his home at Ansonia, Conn., on Saturday, December 29, 1934. He was born in Cwmavon, Wales, October 22, 1865, and received his early education in the British National Schools and at Llandovery Collegiate School. At the age of 17 he came to the United States with his parents and in 1883 entered the employ of the Farrel Foundry & Machine Co., as a machinist's apprentice. After serving his apprenticeship for three years he worked as a machinist for two years longer, then entering the drafting room of the Farrel Company. During the next ten years his exceptional ability as an engineer led to his appointment as chief engineer, a position which he held until 1930, when he was elected vice-president, in charge of engineering. In July, 1933, ill health compelled him to relinquish active direction of engineering, when R. A. North succeeded him as engineer. He is survived by his widow, a son, daughter and two grandchildren.

Philippine Trade Brisk

The Bureau of Foreign and Domestic Commerce reports that business in the Philippine Islands is brisk. Tire sales during the first 10 months of 1934 were about the same as the corresponding 1933 period, but higher in value since prices have advanced about 10%. Sales of mechanical rubber products in the mining districts have been good with the bulk of the business going to American manufacturers. Japanese competition in rubber belting is reported increasing, especially in Davao, and in sales to rice mills where price is an important factor.

Golf Ball Imports Lower

Imports of golf balls during October, 1934, numbered 15,600 valued at $3,202, a unit value of 20.5 cents per ball, according to the Bureau of Foreign and Domestic Commerce. This compares with a unit value of 22.7 cents in September and 24.5 cents in August, 1934. Other rubber ball imports into the United States from England, Austria and Japan for the same month amounted to 35,188 valued at $1,244. $20,841 worth of rubber toys were also imported during October.

Machinery Companies Merge

The merger of the Brown Instrument Company, Philadelphia, with the Minneapolis-Honeywell Regulator Company, Minneapolis, was announced last month. The Brown Instrument concern will continue as a separate company with its existing organization but as a subsidiary of the Minneapolis-Honeywell company. Sales and service facilities of the Brown Instrument Company will be continued from the main office and factory at Philadelphia.

German Tire Exports Rise

Germany exported 112,959 automobile casings during the first nine months of 1934, compared with 95,100 in the same period of 1933, reports the Bureau of Foreign and Domestic Commerce. Inner tubes exported for the 1934 period amounted to 80,881 compared to 73,929 for the first nine months of 1933. A total of 1,856 solid tires were also exported in the current period. The largest importer was the Netherlands.

New Rubber Goods

Novelty Rubber Balloons

Faultless Rubber Company, Ashland, Ohio, is now merchandising a line of water-cured novelty rubber balloons featuring maps and jungle scenes. Various sketches of maps of many countries

come into view when the balloons are inflated. The jungle scene balloons respond in the same manner, hidden features appearing when inflation takes place. These balloons have a tensile strength of 3,000 to 5,000 pounds and an elongation of from 800 to 1,000%.

Goodrich Wheelbarrow Tire

One of the newest and most novel uses for pneumatic tires is reported by the B. F. Goodrich Company, Akron, in announcing one of its latest products, the single tube wheelbarrow tire. Goodrich engineers say that many contractors throughout the country are using only wheelbarrows equipped with pneumatic tires in their work on roofing jobs. The cushioned wheelbarrow is able to haul its loads without the risk of damage to the roof present when barrows with the older type wheels are used. It is also valuable in hauling loads over sod or soft ground, requiring no planking. The new Goodrich single tube pneumatic tire for wheelbarrows is similar to a bicycle tire in that no inner tube is required. It is therefore much easier to apply and service.

A Resilient Rug Cushion

Something new in the carpet underlay field has been introduced under the trade name of Velvetex by the Fabrics Division, E. I. du Pont de Nemours & Company, Inc., Fairfield, Connecticut. The new product is a resilient rug cushion which makes liberal use of rubber in its make-up, and which also acts as a non-skid rug lining. It adds longevity to rugs and is sanitary, non-absorbent and washable. It does not collect dirt. Moths do not touch it. Another feature of Velvetex, according to its manufacturers, is that it serves as a rug by itself when the rug is removed for cleaning, etc. American Rug & Carpet Co., Chicago, are the sales agents.

Ignition Cable Uses DuPrene

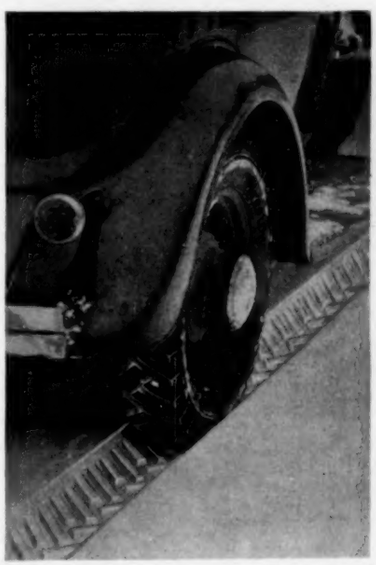
Belden Manufacturing Company, Chicago, has developed a new type of ignition cable which uses DuPrene as a protective covering. The use of the duPont product enables the use of ignition cable for automotive service in such places where resistance to heat, oil and corona conditions are necessary. The properties of DuPrene enable the new wire to successfully combat these conditions.

Rubber Swing Safety Seat

A new style safety seat for playground swings, made of rubber, is now being manufactured by the Everwear Manufacturing Company, of Springfield, Ohio. The rubber seat consists of five long bars held firmly together by rods inserted through openings at both ends and in the middle of the seat. Being flexible the child using the swing is more comfortable than when the ordinary wooden seats are used. The device is patented by F. C. Garratt, Jr.

Firestone Mud-and-Snow Tire

Rugged in appearance and different in traction and riding comfort from any tire of the past, a new "mud and snow" tire brings safe, dependable travel for motorists under the most adverse road conditions of winter. Developed by Firestone Tire & Rubber Company engineers, the scientific design provides easy steering, maximum traction in snow or mud and smooth riding on paved streets and highways. This tire is said to be ideal for motorists who drive over unimproved roads part of the time, especially in winter. For the driver who wants maximum protection against skid-



ding in city or country, the new tire has many advantages over chains, in riding comfort and in protection from side slips. Greater traction pulls it through mud holes and snow drifts. It is of heavy duty construction, and is made in passenger car sizes only.

MARKETS

RUBBER—COTTON AND FABRICS—CHEMICALS

NEW YORK, JANUARY 8, 1935

Crude Rubber

ALTHOUGH speculators kept the price of crude rubber on the Exchange down throughout November, the effect of the restriction scheme was felt during December and early January. Due to a much firmer situation in London and Far Eastern markets crude rubber prices have been advancing steadily since the Christmas holidays. The price of 13.65 reached on the Exchange on January 7 was the highest quoted since October 30 when it was 13.75. The fact that stocks, in accordance with the aims of the restriction committee, are not as freely available as heretofore, except at higher prices, is also contributing to the advance. Crude rubber sales on the Exchange reached a new high on December 14 when 13,570 tons were handled. Single day sales of late have averaged about 1,200 tons. Prices in futures are also on the upward trend. Quotations in the outside market, Exchange, London and Singapore follow:

As of January 8

Plantations—

Ribbed Smoked Sheets—			
Spot	—	@	.13¼
February	—	@	.13⅞
Apr.-June	—	@	.14¼
First Latex, crepe spot	—	@	.14⅛
Amber Crepe, No. 2	—	@	.11⅞
Amber Crepe, No. 3	—	@	.11¾
Amber Crepe, No. 4	—	@	.11⅝
Brown Crepe, clean thin	—	@	.11⅞
Brown Crepe, rolled	—	@	.11⅞

Latex—

Liquid Latex, per gal.	.57	@	—*

Paras—

Up-River, fine	—	@	.09¼
Acre Bolivian, fine	—	@	.09½

Balata—

Block, Ciudad	—	@	.38

LONDON MARKET

Standard Smoked Sheets—Buyers—Jan. 8			
January	—	@	6 11/16d
Apr.-June	—	@	6 15/16d

SINGAPORE MARKET

Standard Smoked Sheets—Sellers—Jan. 8			
January	—	@	6 5/16d
Apr.-June	—	@	6 11/16d

Reclaimed Rubber

Interest in forward contracts for reclaimed rubber continues light, but reclaimers still look for a fair business increase in the next month or two. For the first time in many months the percentage of reclaim to crude, that for November consumption, lost ground, being 22.3 compared with 26.1 for October. Prices are unchanged since our last report, as follows:

High Tensile

Super-reclaim, black	.08¾	@	.09
High Tensile Red	.07	@	.07¼

Shoe

Unwashed	.06½	@	.06¾
Washed	.08	@	.09

Tube

No. 1 (Floating)	.13	@	—
No. 2 (Compounded)	.07½	@	.07¾

Tires

Black	.05	@	.05¼
Black, selected tires	.05¼	@	.05½
Dark Gray	.06¼	@	.06½
White	.09¼	@	.09½
Truck, Heavy Gravity	.05½	@	.06
Truck, Light Gravity	.06	@	.06¼

Miscellaneous

Mechanical blends	.04¼	@	.04½

Scrap Rubber

The market for scrap rubber continues to be light, with prices on some grades rising slightly because of limited supplies rather than demands from reclaimers. Dealers look forward to increased activity within the next month or two. Prices are as follows:

(Prices to Consumers)

Auto tire peelings	ton 17.00	@	19.00
Mixed auto	ton 7.50	@	8.50
Clean solid truck tires	ton 35.00	@	37.50
Boots and shoes	ton 20.00	@	21.50
Arctics, untrimmed	ton 17.50	@	18.50
Inner tubes, No. 1	lb. .07	@	.07½
Inner tubes, No. 2	lb. .03½	@	.03⅝
Inner tubes, Red	lb. .02½	@	.02¾

Cotton

A steady tone was apparent in the cotton market during December and early January with prices moving in a 20 point range on the Exchange from 12.65 to 12.85. Domestic mills are buying spot cotton in small volume and are generally inclined to limit purchases to cover immediate requirements. Export demand has increased slightly, particularly from the Orient. Cables to this country stress the lack of supplies of desirable foreign growths. The industry still awaits definite action from the government, such action being highly problematical. The only inkling secured from government officials is that government selling of cotton would be handled in a manner intended not to disturb the price level, if possible. Current prospects are for the maintenance of compulsory control of production in this country, a factor favored by the producers. Quotations for middling uplands on the N. Y. Cotton Exchange follow:

	Dec. 8	January 8		
	Close	High	Low	Close
January	....	12.60	12.58	12.59
March	12.54	12.71	12.62	12.69
May	12.54	12.80	12.70	12.78

Tire Fabrics

(Prices Net at the Mill—Process Tax Included)

Peeler, carded, 23/5/3	lb. .36½	@	.37
Peeler, carded, 23/4/3	lb. .37½	@	.38
Peeler, carded, 15/3/3	lb. .34½	@	.35
Peeler, carded, 13/3/3	lb. .33½	@	.34
Egyptian, carded, 23/5/3	lb. .48½	@	.49
Egyptian, combed, 23/5/3	lb. .52½	@	.53
CHAFERS			
Carded, American, 1 1/16"	lb. .36½	@	.38
Carded, American, 1"	lb. .31	@	.33½
LENO BREAKER			
Carded, American, 1 1/16"	lb. .37	@	.39
Carded, American, 1"	lb. .31	@	.33½

Sheetings

Count	Width	Weight			
48x40	36 in.	5.50	lb.	— @	.05¾
40x40	36 in.	6.15	lb.	— @	.05⅞
40x36	36 in.	6.50	lb.	— @	.04⅞
48x48	40 in.	2.50	lb.	— @	.11¼
48x48	40 in.	2.85	lb.	— @	.10
64x68	40 in.	3.15	lb.	— @	.10¼
56x60	40 in.	3.60	lb.	— @	.08¾
48x44	40 in.	3.75	lb.	— @	.08⅛
44x40	40 in.	4.25	lb.	— @	.07¼

Ducks

Enameling	lb. .32	@	.37½
Belting and Hose	lb. .34	@	—
Single filling, A grade	lb. .16¼	@	.17½
Double filling	lb. .17¾	@	.18¾

Closing Rubber Prices on New York Commodity Exchange, Inc.

No. 1 Standard Contract of 10 tons

FROM DECEMBER 10 TO JANUARY 8

Date	Spot	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Sales
Dec. 10	12.94	12.92	13.05	13.15	13.25	13.35	13.45	13.55	13.66	13.76	13.86	13.96	14.06	——	138
11	12.87	12.85	12.90	13.02	13.14	13.22	13.31	13.41	13.51	13.61	13.72	13.81	13.91	——	244
12	12.89	12.93	13.00	13.09	13.18	13.27	13.37	13.47	13.57	13.66	13.76	13.86	13.96	——	158
13	12.85	12.83	12.90	12.98	13.06	13.16	13.26	13.36	13.46	13.55	13.64	13.74	13.84	——	129
14	12.87	12.83	12.93	13.02	13.11	13.19	13.29	13.38	13.48	13.59	13.70	13.80	13.90	——	1357
15	12.90	12.90	12.99	13.08	13.18	13.27	13.37	13.47	13.57	13.67	13.77	13.87	13.97	——	99
16	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
17	12.94	12.93	13.00	13.10	13.19	13.28	13.37	13.46	13.55	13.67	13.80	13.90	14.00	——	174
18	13.00	12.99	13.03	13.11	13.20	13.30	13.40	13.48	13.57	13.67	13.77	13.87	13.97	——	73
19	13.00	12.98	13.03	13.13	13.23	13.32	13.41	13.49	13.58	13.68	13.78	13.89	13.99	——	67
20	12.88	12.92	12.96	13.08	13.20	13.28	13.36	13.46	13.56	13.66	13.76	13.86	13.96	——	57
21	12.84	12.80	12.87	12.97	13.08	13.18	13.28	13.37	13.47	13.56	13.66	13.76	13.86	——	140
22	12.85	12.85	12.85	12.96	13.07	13.16	13.26	13.35	13.45	13.55	13.65	13.75	13.85	——	76
23	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
24	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
25	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
26	12.85	12.83	12.87	12.98	13.09	13.18	13.27	13.37	13.47	13.57	13.67	13.77	13.87	——	83
27	12.81	12.77	12.81	12.91	13.02	13.12	13.23	13.32	13.42	13.51	13.60	13.70	13.80	——	219
28	12.75	——	12.76	12.88	13.00	13.10	13.20	13.29	13.38	13.49	13.61	13.71	13.81	——	265
29	12.95	12.91	12.95	13.06	13.18	13.26	13.35	13.46	13.57	13.67	13.77	13.87	13.97	——	124
30	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
31	13.10	——	13.12	13.23	13.35	13.44	13.54	13.64	13.75	13.84	13.94	14.09	14.19	——	241
Jan. 1	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
2	13.14	——	13.17	13.28	13.40	13.50	13.59	13.70	13.80	13.90	14.00	14.10	14.20	14.30	217
3	13.46	——	13.47	13.58	13.70	13.80	13.90	14.00	14.10	14.20	14.30	14.40	14.50	14.60	636
4	13.52	——	13.53	13.64	13.76	13.86	13.96	14.15	14.16	14.26	14.37	14.47	14.57	14.67	637
5	13.52	——	13.55	13.65	13.75	13.85	13.95	14.10	14.16	14.26	14.37	14.46	14.55	14.64	306
6	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
7	13.65	——	13.74	13.84	13.94	14.03	14.12	14.23	14.34	14.43	14.53	14.63	14.73	14.83	430
8	13.71	——	13.70	13.81	13.91	14.01	14.12	14.22	14.32	14.41	14.51	14.61	14.71	14.81	471

Rubber CHEMICAL Markets

NEW YORK, JANUARY 10, 1935

[All Quotations F.O.B. Works Unless Otherwise Noted]

ACCELERATORS

Organic			
A-1 (Thiocarbanilid)	lb.	.21 @	.25
A-5-10	lb.	.33 @	.36
A-7	lb.	.53 @	.65
A-11	lb.	.60 @	.75
A-16	lb.	.55 @	.65
A-19	lb.	.56 @	.75
A-32	lb.	.70 @	.80
A-17	lb.	— @	—
Aldehyde ammonia, crystals	lb.	.65 @	.67
Altax	lb.	— @	—
Captax	lb.		
Crylene	lb.	.55 @	.65
paste	lb.	.45 @	.55
Di-Ortho-Tolyguanidine	lb.	.46 @	.47
Diphenylguanidine	lb.	.36 @	.37
Ethylidene aniline	lb.	.45 @	.47½
Formaldenyde aniline	lb.	.37½ @	.42
Guantal	lb.	.42 @	.51
Heptene	lb.	.40 @	—
Hexamethylene-tetramine	lb.	.37 @	—
Lead Oleate, No. 999	lb.	.11 @	—
Witco	lb.	.11 @	—
Lithex	lb.	.18 @	.20
Methylenedianiline	lb.	.36 @	.37
Monex	lb.	3.25 @	—
Oxynone	lb.	.68 @	.80
Phenex	lb.	.50 @	.55
Pipsolene	lb.	3.55 @	4.00
R & H 40	lb.	.40 @	.41
R & H 50	lb.	.40 @	.41
R-2	lb.	1.55 @	1.90
Safex	lb.	1.20 @	1.25
SPDX	lb.	.75 @	—
Super-Sulphur No. 1	lb.		
No. 2	lb.		
Thiocarbanilid, drums	lb.	.21 @	.25
Trimene	lb.	.75 @	—
base	lb.	1.20 @	—
Triphenylguanidine	lb.	.58 @	.60
Tuads	lb.		
Ureka	lb.	.62 @	1.00
Ureka B	lb.	— @	—
Ureka C	lb.	.58 @	.69
Vulcanex	lb.		
Vulcone	lb.		
Vulcanol	lb.		
Z-88-P	lb.	.48 @	.60
Zimate	lb.		
Inorganic			
Litharge, domestic	lb.	.06½ @	—
Magnesia, calcined, heavy	ton	60.00 @	65.00

COLORS

Blacks (See Compounding Materials)

Blues			
Prussian	lb.	.36 @	.38
Ultramarine	lb.	.12 @	.15
Browns			
Sienna, Italian	lb.	.06 @	'13
Umber, Turkey	lb	.04 @	.04½
Greens			
Chrome, light	lb.	.20 @	.30
medium	lb.	.21 @	.31
dark	lb.	.24 @	.30
Chromium Oxide, bbl.	lb.	.22 @	.23
Reds			
Antimony			
crimson, 15/7	lb.	.46 @	—
sulfur, free	lb.	.48 @	.52
Indian English	lb.	.09 @	.10
Domestic (Maroon)	lb.	.11 @	—
Red oxide, pure	lb.	.10 @	.12
Rub-Er-Red, f.o.b. Easton	lb.	.09¼ @	—
Whites			
Cryptone CB, No. 21	lb.	.06 @	.06¼
Cryptone, No. 19	lb.	.06 @	.06¼
Lithopone			
Albalith, black label—11	lb.	.04½ @	.04¾
Azolith	lb.	.04½ @	.04¾
Rayox	lb.		
Titanium oxide	lb.	.17 @	.19
Titanox B	lb.	.06 @	.06½
Titanox C	lb.	.06 @	.06½
XX—20 Zinc Sulphide, bbls.	lb.	.11 @	.11¼
XX—86 Zinc Sulphide, bbls.	lb.	.11 @	.11¼
Zinc Oxide—American Process			
American Azo:			
ZZZ (lead free)	lb.	.06½ @	.06¾
ZZ (leaded)	lb.	.06¼ @	.06½
Horsehead Lead Free Brand:			
Special—3	lb.	.06½ @	.06¾
XX Red—4	lb.	.06½ @	.06¾
XX Red—72	lb.	.06½ @	.06¾
XX Red—78	lb.	.06½ @	.06¾
XX Red—103	lb.	.06½ @	.06¾
U. S. P.—X, bbls.	lb.	.12½ @	.12¾
Kadox, black label—15	lb.	.09⅜ @	.09⅝
Blue label—16	lb.	.08⅜ @	.08⅝
Red label—17	lb.	.07 @	.07¼
St. Joe, black label	lb.	.06½ @	.06¾
green label	lb.	.06½ @	.06¾
red label	lb.	.06½ @	.06¾
Zinc Oxide—French Process			
Anaconda, lead free	lb.	.06½ @	.06¾
Anaconda, selected lead free	lb.	.06¾ @	.07
Florence White seal—7 bbls.	lb.	— @	.10¾
Green seal—8	lb.	.09⅜ @	.09⅝
Red seal—9	lb.	.08⅜ @	.08⅝
Yellows			
Chrome	lb.	.15 @	.16
Ocher, dom. med.	lb.	.01½ @	.02

BLACKS

Arrow "Aerfloted" Specification	lb.	.0535 @	.0825
Bone, powdered	lb.	.05½ @	.12½
Carbon, compressed	lb.	.0535 @	.0825
uncompressed	lb.	.0535 @	.0825
"Certified," Cabot	lb.	.0535 @	.0825
Spherons	lb.	.0535 @	.0825
"Disperso"	lb.	.0535 @	.0825
Drop, bbls.	lb.	.05½ @	.14
"Excello," compressed	lb.	.0535 @	.0825
"Fumonex"	lb.	.03 @	.07
"Gastex"	lb.	.03 @	.07
Lampblack	lb.	.07 @	.12
"Micronex"	lb.	.0535 @	.0825
"Supreme"	lb.	.0535 @	.0825
Thermatomic—"P 33"	lb.	— @	—
"Thermax"	lb.	— @	—
United "Dixie" & "Kosmos"	lb.	.0535 @	.0825

COMPOUNDING MATERIALS

Aluminum Flake	ton.	21.85 @	24.50
Ammonia carbonate, lump	lb.	.10½ @	.12
Asbestine	ton	14.00 @	15.00
Barium carbonate (98-100%)	ton	56.50 @	61.50
Barium Dust	lb.	.05 @	.06
Barytes	ton	22.00 @	24.00
Basofor	lb.	.04½ @	—
Bentonite	lb.	.02 @	.03
Blanc fixe dry f.o.b. works	ton	70.00 @	75.00
Calcene	ton	35.00 @	43.00
Catalpo (fact.)	lb.	.02 @	—
Chalk, precipitated			
Suprex white, extra lt.	ton	60.00 @	75.00
heavy	ton	45.00 @	55.00
Clay, Kaolin, domestic	ton	7.50 @	15.00
Aerfloted, Suprex	ton	7.50 @	10.00
Congaree	ton	9.00 @	—
Dark Blue Ridge	ton		
Dixie	ton		
Lexington	ton	10.00 @	22.00
McNamee	ton		
Par	ton		
Tensulite		15.00 @	—
Witco	ton	8.50 @	9.00
Cotton Flock	lb.	.10½ @	.18
Glues, extra white	lb.	.28 @	.30
medium white	lb.	.14 @	.19
Kalite No. 1	ton	30.00 @	55.00
Kalite No. 3	ton	40.00 @	65.00
Magnesium carbonate	lb.	.06½ @	.06¾
Mica	ton	65.00 @	80.00
Rottenstone (powdered)	lb.	.02½ @	.05
Soapstone, powdered	ton	16.00 @	22.00
Starch, powdered	cwt.	3.56 @	3.76
Talc, domestic	ton	12.00 @	15.00
Pyrax A	ton		
Whiting, commercial	ton	17.00 @	18.00
English Cliffstone	ton	33.00 @	43.00
Sussex	ton		
Witco	ton	15.00 @	—
Wood Flour	ton	18.00 @	30.00
Zinc Carbonate	lb.	.09½ @	.11
Zinc Stearate	lb.	.19 @	.21

MINERAL RUBBER

Black Diamond	ton	27.00 @	—
Genasco, solid (factory)	ton	25.00 @	27.00
Hard Hydrocarbon	ton		
Parmr. solid	ton	21.00 @	26.00
Pioneer, MR, solid	ton		
Pioneer-granulated	ton		

WETTING AGENTS

Arkesklene	lb.	— @	—

SPECIALTIES

Aromatics—Rodo	lb.		
Para-Dors No. 5145	lb.	2.00 @	—
Sunproof	lb.	.35 @	.37½
Sponge Paste	lb.	— @	.80
Tonox	lb.	.56 @	.60

SOFTENERS

Acids			
Nitric, 36 degrees	cwt.	5.00 @	6.00
Sulfuric, 66 degrees	ton	15.50 @	16.50
Tartaric, crystals	lb	.26 @	—
Acids, Fatty			
Laurex	lb.	.15 @	.16
Stearex	lb.	.08½ @	.13
Stearic, double pressed	lb.	.09 @	.14
Alkalies			
Caustic Soda, 76%	cwt.	3.60 @	3.75
Soda Ash, 58% C.L.	cwt.	2.52 @	—
Oils			
Corn, refined, bbls.	lb.	.08½ @	.08⅝
Cottonseed, crude	gal.	— @	.04
Cycline Oil	gal.	.15 @	.28
Degras (c.l. 100 bbls.)	lb.	.02¾ @	—
Less c.l. (10-25 bbls.)	lb.	.03 @	—
Lots less than 10 bbls.	lb.	.03¼ @	—
Fluxrite	lb.	.05½ @	.06½
Palm Lagos	lb.	.03½ @	.03¾
Niger	lb.	.03¾ @	.03½
Para-Flux	gal.	.17 @	—
Petrolatum, light	lb.	.02 @	.02½
Pigmentaroil, tank cars	gal.	.16 @	—
in drums	gal.	.22 @	.23½
Pine, steam distilled	gal.	.64 @	.65
dest. dist., drums	gal.	.40 @	.45
Rosin Oil, cmpd.	gal.	.40 @	—
Rubtack	lb.	.40 @	—
Seedine, c.l.	lb.	.07¼ @	—
Tackol	lb.	.08½ @	.18
Witco Palm Oil	lb.	.05 @	—
Witco Softener (f.o.b. wks.)	gal.	.15 @	—
Woburn No. 8, c.l.	lb.	.06 @	—
Wobonite, c.l.	lb.	.05 @	—
Resins and Pitches			
Pitch, Burgundy	lb.	.05 @	.06
coal tar	gal.	.05½ @	.06
hardwood	ton	20.00 @	25.00
pine, 200 lb. gr. wt.	bbl.	6.00 @	—
Rosin, grade K, 280 lb.	bbl.	5.85 @	—
Pigmentar, tank cars	gal.	.16 @	—
in drums	gal.	.22 @	.23½
R. S. L. Resin	lb.	— @	—
Retort Pine Tar, drums	bbl.	12.00 @	13.00
Solvents			
Acetone, pure	lb.	.12½ @	.13½
Alcohol, denatured, methanol, No. 1 bbls.	gal.	.30½ @	.35½
Benzene, 90%	gal.	— @	.19
Bondogen	lb.	— @	—
Carbon, bisulfide	lb.	.05½ @	.06
Carbon, tetrachloride	lb.	.05 @	.05¼
Dichlorethylene	lb.	.29 @	—
Dipentene, cml., drums	gal.	.40 @	.41
Dryolene (f.o.b. Okla.)	gal.	.10 @	.10½
Ethylene dichloride	lb.	.05½ @	.06½
Gasoline, steel bbls.	gal.	.16 @	—
Naphtha, solvent	gal.	.26 @	.31
Plastogen	lb.		
Rub-Sol (f.o.b. Okla.)	gal.	.09 @	—
Turpentine, spirits	gal.	.46½ @	.50½
dest. dist., drums	gal.	.39 @	.41
Waxes			
Beeswax, white	lb.	.34 @	.37
Carnauba, yellow	lb.	.37 @	.40
Ceresin, white	lb.	.10 @	.11
Montan, crude	lb.	.10 @	.11
Ozokerite, black	lb.	.24 @	.25
green	lb.	.26 @	.30
Paraffin (c.l.—f.o.b. N. Y.)			
Yellow crude scale	lb.	.03¼ @	—
White crude scale 124/126	lb.	.03¼ @	—
Refined, 125/127	lb.	.04¼ @	—

ANTI-OXIDANTS

AgeRite, Gel	lb.		
Powder	lb.		
Resin	lb.		
White	lb.		
Albasan	lb.	.70 @	.75
Antox	lb.		
B-L-E	lb.	.57 @	.60
Flectol-H	lb.	— @	—
Flectol White	lb.	— @	—
Flectol B	lb.	— @	—
Neozone	lb.		
Oxynone	lb.	.66 @	.90
Retardex	lb.	.35 @	.40
Stabilite	lb.	.57 @	.62
Stabilite Alba	lb.	.70 @	.75
VGB	lb.	.55 @	.60

MOLD LUBRICANTS

Cocoa Soapstock	lb.	.06 @	.08
Dipex	lb.	.06 @	.08
Rusco, f.o.b. Nitro	lb.	.12 @	.30
Sericite, f.o.b. N. Y.	ton	65.00 @	—
Soap Tree Bark, cut, sifted	lb.	.06 @	.08
Zip (Mold Wash)	lb.	— @	—

FACTICE

Amberex	lb.	.13¼ @	—
Black	lb.	.08½ @	—
White	lb.	.08 @	.12
Brown	lb.	.07 @	.11½
Duphax	lb.	.10 @	—

VULCANIZING INGREDIENTS

Sulfur Chloride, yellow (drs.)	lb.	.03½ @	.04½
Sulfur flour,			
Refined, 100% pure (bags)	cwt.	3.45 @	—
Commercial (bags)	cwt.	1.95 @	2.80
Telloy	lb.		
Vandex	lb.		

Crude Rubber
Latex and Guayule
Reclaimed Rubber
Tires and Tubes

STATISTICS OF THE INDUSTRY

Rim Production
Automobiles
Gasoline
Cotton Prices

U. S. Imports and Exports of Crude Rubber

YEARS	Gross Imports: Long Tons	Gross Imports: Total Declared Value	Gross Imports: Average Declared Value per pound Cents	Re-exports: Long Tons	Re-exports: Total Declared Value	Re-exports: Average Declared Value per pound Cents	Net Imports: Long Tons
1922	301,076	101,843,188	15.10	4,809	1,921,828	17.84	296,267
1923	309,144	185,060,304	26.72	8,772	5,672,319	28.87	300,372
1924	328,056	174,231,331	23.71	10,309	6,057,637	26.23	317,747
1925	396,642	429,705,014	48.36	14,827	19,847,753	59.76	381,815
1926	413,338	505,817,807	54.63	17,671	22,470,583	56.77	395,667
1927	426,258	339,874,774	35.60	27,775	24,735,488	39.76	398,483
1928	439,731	244,854,973	25.03	32,159	18,128,361	25.17	407,572
1929	560,084	239,178,783	19.15	36,485	16,868,733	20.64	523,599
1930	482,082	139,134,330	12.89	30,205	9,316,205	13.77	451,877
1931	497,138	72,918,949	6.54	25,595	4,255,472	7.42	471,543
1932	409,584	31,936,459	3.47	20,929	2,015,612	4.30	388,655
1933	407,817	44,034,064	4.82	20,537	2,601,352	5.65	427,280
1932:							
Nov.	28,908	2,263,469	3.48	1,745	158,618	4.06	27,163
Dec.	31,384	2,360,061	3.34	770	66,165	3.98	30,614
1933:							
Jan.	29,822	2,213,828	3.03	1,403	109,916	3.49	28,419
Feb.	22,603	1,554,086	3.12	1,244	102,129	3.73	21,359
Mar.	27,936	1,867,657	2.98	1,127	86,216	3.42	26,809
April	20,240	1,291,136	2.85	798	70,111	3.92	19,442
May	26,002	1,694,963	2.93	1,842	189,451	4.59	24,894
June	22,900	1,780,495	3.47	1,276	156,168	5.46	21,624
July	44,625	4,293,111	4.29	1,419	219,945	6.92	43,206
August	44,257	5,391,709	5.44	2,205	302,132	6.12	42,052
Sept.	44,912	6,110,956	6.07	2,369	335,798	8.89	42,543
Oct.	44,474	6,115,330	6.14	2,669	397,167	6.64	41,805
Nov.	40,582	5,850,714	6.44	2,188	333,631	6.81	38,394
Dec.	39,461	5,869,556	6.75	1,888	293,690	6.94	37,573
1934:							
Jan.	47,963	7,403,123	6.89	1,975	352,116	7.96	45,988
Feb.	34,335	5,262,711	6.84	2,133	476,232	9.97	32,202
Mar.	41,119	6,765,173	7.34	2,947	583,313	8.83	38,172
April	43,841	8,232,746	8.37	2,814	588,453	9.18	41,027
May	48,494	10,001,239	9.21	2,389	544,212	10.17	46,105
June*	47,289	10,747,464	10.14	2,012	501,499	11.33	45,277
July	41,443	9,670,617	10.41	2,366	660,199	13.99	39,077
August	31,531	7,873,690	11.15	1,393	400,433	12.83	30,138
Sept.	31,074	8,293,859	11.92	1,665	474,446	12.72	29,409
Oct.	28,318	8,203,447	12.93	1,917	577,702	13.46	26,401
Nov.	36,325	10,470,076	12.87	1,230	327,672	11.89	35,095

* Revised.

United States Imports of Guayule, Balata, Jelutong, Liquid Latex

(All Quantities in Long Tons)

	Guayule Tons	Guayule Dollars	Balata Tons	Balata Dollars	Jelutong Tons	Jelutong Dollars	Liquid Latex (1) Tons	Liquid Latex (1) Dollars
1924	1,356	536,392	464	568,456	6,165	1,237,100	2,157	864,059
1925	3,781	1,803,448	517	574,750	6,749	1,642,531	3,853	3,537,810
1926	4,305	2,562,096	354	327,213	7,263	3,127,757	3,388	4,680,386
1927	5,018	2,674,957	582	447,246	7,785	2,448,657	1,116	876,077
1928	3,075	1,755,685	731	430,855	7,552	2,540,059	4,167	2,185,579
1929	1,231	545,175	728	566,964	8,203	2,458,136	3,728	1,787,997
1930	1,096	347,388	501	422,684	5,907	1,403,244	4,449	1,506,804
1931	—	—	1,208	411,692	5,777	1,019,010	4,650	884,355
1932	—	—	708	147,403	4,607	616,596	5,085	601,999
1933	—	—	1,658	2,261,869	5,989	944,895	11,085	1,833,671
1933:								
Sept.	—	—	65	30,738	761	149,296	1,343	267,516
Oct.	—	—	119	47,663	542	99,249	1,561	310,531
Nov.	—	—	31	11,252	626	125,160	1,239	282,065
Dec.	—	—	42	20,008	708	143,868	1,290	270,533
1934:								
Jan.	—	—	98	43,932	766	169,966	1,126	239,054
Feb.	—	—	68	36,346	453	102,471	885	193,732
Mar.	51	9,464	145	51,080	25	43,532	1,134	257,545
April	100	18,928	128	50,965	533	98,658	1,334	321,390
May	100	18,928	143	65,471	538	95,710	1,407	368,642
June	—	—	84	49,881	388	71,672	1,458	421,317
July	—	—	160	63,963	482	87,412	1,231	385,733
August	100	18,607	100	36,732	516	85,651	1,169	369,335
Sept.	—	—	48	14,415	259	47,542	936	312,967
Oct.	—	—	14	2,797	278	48,287	922	282,503
Nov.	—	—	60	20,169	332	60,904	887	296,447

(1) Weight given in pounds of dry rubber contained in latex.

U. S. Consumption of Crude Rubber

(Rubber Manufacturers' Association statistics raised to 100 per cent—All figures in long tons)

Figures on Monthly Basis

	1927	1928	1929	1930	1931	1932	1933	1934
Jan.	31,518	34,403	43,002	36,194	28,557	29,648	21,661	40,413
Feb.	30,137	33,702	41,594	33,302	28,797	31,821	21,638	40,609
Mar.	36,141	35,688	44,730	35,540	32,788	29,505	18,047	47,097
Apr.	35,871	32,772	47,521	39,686	33,321	27,515	25,928	44,947
May	34,592	37,333	49,233	39,386	37,817	30,957	44,074	43,012
June	33,801	37,676	43,227	34,195	37,916	41,475	50,743*	40,241
July	29,219	37,407	41,526	29,508	31,397	29,976	49,614*	32,647
Aug.	33,460	42,927	38,274	30,850	27,586	23,721	44,428*	33,310
Sept.	27,214	39,882	34,707	25,515	23,638	23,847	35,281*	30,352
Oct.	26,790	40,857	34,800	27,516	22,277	22,286	31,543*	31,347
Nov.	26,792	37,461	27,659	23,691	22,943	23,231	28,831*	34,842
Dec.	25,492	31,232	25,531	21,687	21,409	18,015	29,087	.....
Tot.	371,027	441,340	469,804	375,980	348,986	332,000	402,485*	.....

* Revised.

Figures on Quarterly Basis

Quarter	1926	1927	1928	1929	1930	1931	1932	1933
Jan./Mar.	94,301	99,216	103,558	128,565	101,610	89,652	85,309	64,326
Apr./June	87,109	103,242	103,500	139,292	112,229	107,753	92,643	125,126
July/Sept.	93,793	89,210	117,573	113,746	85,261	83,632	72,523	132,406
Oct./Dec.	83,212	80,860	117,597	84,872	72,020	65,645	64,145	94,198
Totals	358,415	372,528	442,227	466,475	371,120	346,684	314,620	416,056

Note—The quarterly figures are generally regarded as the most authentic; the monthly figures may be accepted as preliminary.

Reclaimed Rubber in the United States

(All Quantities in Long Tons)

Year	Production	Consumption Tons	Consumption % to Crude	Stocks*	Year	Production	Consumption Tons	Consumption % to Crude	Stocks*
1924	80,079	76,072	22.4	.....	1929	218,954	226,588	48.4	27,464
1925	132,930	137,105	35.6	13,203	1930	157,967	153,497	40.8	22,000
1926	180,582	164,500	45.9	23,213	1931	133,351	124,126	33.9	19,257
1927	189,144	178,471	47.6	24,980	1932	75,608	77,504	23.4	16,354
1928	208,516	223,000	50.4	24,785	1933	99,560	81,602	19.9	20,746
1933:									
Jan.	5,301	4,811	21.0	16,262	July	12,049	10,317	20.8	* 14,108
Feb.	4,578	4,363	20.2	16,370	Aug.	11,708	9,446	21.2	* 15,037
Mar.	3,847	3,454	19.1	15,496	Sept.	10,435	7,862	22.3	* 15,869
Apr.	4,617	4,407	13.1	14,370	Oct.	9,466	7,212	22.9	* 17,748
May	8,366	7,770	17.4	13,734	Nov.	9,063	6,335	21.9	* 19,170
June	10,591	9,674	19.1	13,231	Dec.	9,539	5,951	20.5	20,746
1934:									
Jan.	9,828	7,000	17.3	24,263	July	9,446	8,175	25.0	24,926
Feb.	9,504	7,646	18.8	23,356	Aug.	8,160	8,493	25.5	24,607
Mar.	11,479	9,683	20.6	25,113	Sept.	6,974	7,028	23.2	24,540
Apr.	10,185	9,387	20.9	22,033	Oct.	8,145	8,167	26.1	24,511
May	10,848	9,500	22.1	22,887	Nov.	7,268	7,775	22.3	23,999
June	10,820	9,459	23.5	23,664	Dec.	....	....	...	....

* Stocks on hand at the end of month or year.
* Revised.
(Rubber Manufacturers' Association figures raised to 100%)

U. S. Consumption of Gasoline

(In Thousands of Barrels of 42 Gallons)

	1932	1933*	1934		1932	1933*	1934
January	26,038	26,397	29,416	August	35,706	37,400	38,933
February	25,378	23,320	25,048	September	33,828	34,580	34,877
March	29,597	28,123	30,528	October	32,680	33,022	37,544
April	31,234	29,791	32,735	November	29,895	30,312	34,839
May	32,016	33,709	38,141	December	27,110	28,572	.....
June	39,489	37,699	36,296				
July	30,929	34,087	37,393	Total	373,900	377,003*	.....

* Revised on basis of final 1933 figures issued September 26, 1934 by Bureau of Mines.

Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—*New York Market, in Cents per Pound*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Ave.
1932																																
November	3 7/8	3 15/16	3 7/8	3 7/8			3 7/8		3 15/16	3 15/16		3 7/8	3 15/16	3 7/8	3 15/16	3 15/16	3 15/16	3 7/8	3 15/16	3 15/16	3 15/16	3 15/16	3 7/8		3 15/16			3 7/8		3 15/16		3 15/16
December	3 15/16		3 7/8			3 7/8	3 15/16	3 7/8				3 15/16		3 15/16																		
1933																																
January			3 15/16	3 7/8	3 7/8	3 7/8	2 11/16		3 7/8	3 7/8								2 11/16														
February	2 11/16		2 11/16			3	2 11/16		3					3				3														3
March	2 11/16		3 7/16																													3
April	2 7/8		2 7/8		2 11/16							3 1/16																				3 1/16
May	4 5/8		4 7/16	3	4 11/16	3 7/16		3 7/16	4 5/16	3 7/8		3 7/16			4 5/16			4 11/16														5
June	6 3/16		6 7/16		6 7/16	6 7/16		6 7/16	6 3/16	5 11/16		5 7/16	5 7/16		5 7/16		5 7/16	5 7/16														6 1/16
July	6 3/16				7 5/16	7 5/16		7 5/16		6 7/16		6 7/16	6 7/16		8 5/16		7 5/16	8 5/16														8
August	7 5/16		7 5/16		7 5/16	7 5/16		7 5/16		7 5/16		7 5/16	7 5/16		8 5/16		7 5/16	8 5/16														7 15/16
September	7 5/16																															7 15/16
October			7 5/16			7 5/16																										7 15/16
November	7 15/16		8		7 15/16		8			7 15/16		8 5/16																				8 5/16
December	9 1/4			8 5/16	9 5/16	8 11/16	9 1/16	8 5/16		8 5/16		8 5/16																				8 5/16
1934																																
January		9	8 11/16		9	9		8 5/16	8 5/16	8 5/16	8 5/16	8 5/16	8 5/16																			9 5/16
February	9 7/16	10 1/2	9 11/16		10 1/16	10 1/16	10 5/16	10 1/16	10 5/16	10 1/16		11 5/16	11 5/16																			10 1/2
March	10 1/16	11 5/16	11 5/16		11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16		11 5/16	11 5/16																			11
April	11 5/16	14 1/16	14 1/16		15	15 5/16	15 5/16	15 5/16	14	13 5/16		13 5/16	12																			12 5/16
May	14 1/16	13	14		12 3/4	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16		13 5/16	13 5/16																			13 5/16
June	13	14	14 1/16			14 5/16	14 5/16	14 5/16	14 5/16	14 5/16		14 5/16	14 5/16																			14 5/16
July	14	14 3/16	15			15 1/16	15 1/16	15 1/16	15 1/16	15 1/16		15 1/16	15 1/16																			15 1/16
August	14 3/16					15 1/16	15 1/16	15 1/16	15 1/16	15 1/16		15 1/16	15 1/16																			15 1/16
September						15 1/16	15 1/16	15 1/16	15 1/16	15 1/16		15 1/16	15 1/16																			15 1/16
October																																14—
November	14 5/16		13 7/16		15 6/16	14		13 5/16	13 5/16	13 5/16		14 5/16	13 5/16																			13
December	13 5/16		12 7/16		13	13																										—13
1935																																
January		13 3/16	13 1/16	13 5/16	13 1/16		13 3/16	13 3/16																								

Average Spot Closing Prices—Ribbed Smoked Sheets

(New York Market)

Average Price per Pound for Years 1910-1929

Year	Cents	Year	Cents	Year	Cents	Year	Cents	Year	Cents
1910	206.60	1914	65.33	1918	60.15	1922	17.50	1926	48.50
1911	141.30	1915	65.85	1919	48.70	1923	29.45	1927	37.72
1912	121.60	1916	72.50	1920	36.30	1924	26.20	1928	22.48
1913	82.04	1917	72.23	1921	16.36	1925	72.46	1929	20.55

Average Monthly Price per Pound Since 1928

Month	1928 Cents	1929 Cents	1930 Cents	1931 Cents	1932 Cents	1933 Cents	1934 Cents
Jan.	40.25	20.14	15.24	8.34	4.38	3.08	9.32
Feb.	32.75	23.97	15.85	7.70	4.03	2.95	10.45
Mar.	26.82	24.55	15.34	7.71	3.35	3.01	11.01
Apr.	18.97	21.18	14.93	6.43	3.02	3.56	12.10
May	18.99	21.46	14.24	6.49	3.09	4.95	13.26
June	19.59	20.64	12.45	6.35	2.66	6.15	13.51
July	19.40	21.30	11.24	6.37	2.89	8.01	14.60
Aug.	19.46	20.59	9.96	5.38	3.63	7.31	15.47
Sept.	18.47	20.37	8.28	5.08	3.84	7.30	15.36
Oct.	18.83	19.67	8.20	4.87	3.65	7.64	13.96
Nov.	18.26	16.62	9.01	4.65	3.44	8.66	13.04
Dec.	17.97	16.12	9.05	4.64	3.24	8.87	12.98
Average for Year	22.48	20.55	11.98	6.17	3.49	5.96	12.92

London Closing Prices of Ribbed Smoked Sheets

(In Pence Per Pound)

Day	Oct.	Nov.	Dec.	Jan.	Day	Oct.	Nov.	Dec.	Jan.
1	7 1/8	6 1/4	6 3/8	—	17	6 7/8	6 7/8	6 7/8	
2	7 1/8	6 5/8	—	6 3/8	18	6 7/8	—	6 1/4	
3	6 15/16	6 3/8	6 7/8	6 7/8	19	6 15/16	6 1/4	6 1/4	
4	7	—	6 7/8	6 3/8	20	6 15/16	6 1/4	6 1/4	
5	6 3/4	6 7/8	6 7/8	6 3/8	21	—	6 7/8	6 7/8	
6	6 15/16	6 3/8	6 3/4	—	22	6 15/16	6 7/8	—	
7	—	6 3/8	6 7/8	6 3/8	23	6 7/8	6 7/8	—	
8	6 7/8	6 7/8	6 3/4	6 15/16	24	6 15/16	6 1/4	—	
9	6 15/16	6 7/8	—		25	6 3/4	—	—	
10	6 3/4	6 7/8	6 7/8		26	6 3/4	6 7/8	—	
11	6 15/16	—	6 3/4		27	6 15/16	6 3/8	6 7/8	
12	6 15/16	—	6 3/4		28	—	6 3/8	6 7/8	
13	6 15/16	6 3/8	6 7/8		29	6 7/8	—	6 3/4	
14	—	6 3/4	6 7/8		30	6 3/8	6 7/8	—	
15	6 7/8	6 7/8	6 7/8		31	6 3/8	—	6 3/8	
16	6 7/8	6 3/4	—						

Average Monthly Price Per Pound

Month	1931 Pence	1932 Pence	1933 Pence	1934 Pence	Month	1931 Pence	1932 Pence	1933 Pence	1934 Pence
Jan.	4.160	3.052	2.264	4.429	Aug.	3.385	2.654	3.811	7.401
Feb.	3.823	2.760	2.093	4.920	Sept.	2.524	2.485	3.728	7.409
Mar.	3.822	2.047	2.099	5.136	Oct.	2.898	2.425	3.957	6.806
Apr.	3.082	1.876	2.323	5.712	Nov.	2.890	2.518	4.096	6.294
May	3.035	1.825	2.966	6.207	Dec.	3.115	2.444	4.200	6.295
June	3.082	1.750	3.392	6.245	Average for				
July	3.048	1.875	3.860	7.053	Year	3.155	2.434	3.233	6.159

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market)

Recent Daily Price Per Pound

Date	Nov.	Dec.	Jan.	Date	Nov.	Dec.	Jan.	Date	Nov.	Dec.	Jan.
1	12.25	12.75	—	11	—	12.80		21	12.55	12.75	
2	12.30	—	12.85	12	—	12.80		22	12.55	12.80	
3	12.30	12.65	12.85	13	12.60	12.75		23	12.55	—	
4	—	12.65	12.85	14	12.50	12.80		24	12.55	12.80	
5	12.30	12.80	12.75	15	12.55	12.80		25	—	—	
6	—	12.70	—	16	12.55	—		26	12.70	12.75	
7	12.50	12.70	12.85	17	12.55	12.70		27	12.69	12.75	
8	12.40	12.70	12.90	18	—	12.75		28	12.85	12.85	
9	12.50	—		19	12.55	12.75		29	—	12.85	
10	12.60	12.75		20	12.55	12.75		30	12.80	—	
								31	—	12.85	

Average Monthly Price Per Pound

	1931 Cents	1932 Cents	1933 Cents	1934 Cents		1931 Cents	1932 Cents	1933 Cents	1934 Cents
Jan.	10.27	6.65	6.23	11.25	Aug.	7.21	7.43	9.55	13.40
Feb.	10.96	6.85	6.05	12.28	Sept.	6.52	6.30	9.64	13.00
Mar.	10.90	6.86	6.39	12.30	Oct.	6.32	6.30	9.58	12.48
Apr.	10.19	6.16	7.02	11.80	Nov.	6.44	6.22	10.04	12.53
May	9.38	5.72	8.64	11.44	Dec.	6.25	6.00	10.17	12.76
June	9.05	5.02	9.47	12.20	Average for				
July	9.28	5.87	10.76	12.84	Year	8.56	6.41	8.63	12.36

World Stocks of Crude Rubber

ON HAND OR AFLOAT TO THE U. S.

At End of	ON HAND 1932	ON HAND 1933	ON HAND 1934	AFLOAT 1932	AFLOAT 1933	AFLOAT 1934	ON HAND AND AFLOAT 1932	ON HAND AND AFLOAT 1933	ON HAND AND AFLOAT 1934
Jan.	322,860	396,376	368,660	42,234	32,539	45,768	365,094	428,915	414,428
Feb.	318,936	381,794	357,094	51,728	32,898	53,063	370,604	414,692	410,157
Mar.	329,586	390,135	353,242	44,190	29,531	54,722	373,776	419,666	405,786
Apr.	336,957	382,167	351,981	40,387	30,745	56,251	377,344	412,912	408,232
May	336,719	364,623	351,329	50,453	43,342	57,921	387,172	407,965	409,250
June	334,657	333,954	358,149	43,079	63,608	46,698	377,736	397,562	404,847
July	333,729	326,609	364,883	37,894	57,435	45,869	371,623	384,044	410,752
Aug.	342,888	325,148	362,647	42,846	53,084	40,278	385,734	378,232	402,925
Sept.	346,154	334,637	359,667	46,188	57,255	38,831	342,892	391,982	398,498
Oct.	358,282	343,579	362,018	40,176	58,568	38,247	398,458	402,147	400,265
Nov.	360,386	353,852	361,236	40,879	57,140	38,625	401,265	410,992	399,861
Dec.	379,000	364,541		38,360	55,606		417,360	419,147	

(Rubber Manufacturers' Association figures raised to 100%)

STOCKS IN GREAT BRITAIN

Stocks in London

(No. of Tons in Wharves and Warehouses, including Latex)

At end of	1932	1933	1934	At end of	1932	1933	1934
Jan.	67,166	36,481	38,570	July	48,842	41,178	50,490
Feb.	65,942	37,182	38,752	Aug.	47,079	39,480	48,953
Mar.	64,280	40,689	40,501	Sept.	44,942	39,237	56,103
Apr.	61,848	40,911	42,413	Oct.	42,327	37,101	63,079
May	56,089	41,998	42,190	Nov.	40,606	36,139	67,656
June	51,009	43,032	45,674	Dec.	37,407	35,615	

At End of Recent Weeks

	First Saturday	Second Saturday	Third Saturday	Fourth Saturday	Fifth Saturday
1934					
June	42,503	43,308	43,709	44,157	45,711
July	47,607	48,908	49,654	49,834	
Aug.	50,860	51,555	51,640	51,362	
Sept.	48,255	50,028	52,320	53,924	56,030
Oct.	57,272	59,469	61,043	62,058	
Nov.	64,232	65,728	67,109	67,088	
Dec.	67,901	69,337	70,256	71,849	72,314

Stocks in Liverpool

1934					
June	54,103	54,294	54,327	54,228	54,161
July	54,966	55,141	55,749	55,556	
Aug.	55,467	55,681	55,757	56,343	
Sept.	56,383	58,006	58,182	59,028	57,477
Oct.	54,944	55,266	57,414	57,944	
Nov.	58,380	59,616	60,281	60,543	
Dec.	60,164	60,125	62,243	62,573	62,617

STOCKS IN PENANG AND SINGAPORE

(Stocks held by Dealers—Quantities in Long Tons)

End of	1931	1932	1933	1934	End of	1931	1932	1933	1934
Jan.	48,802	48,850	22,525	40,405	July	51,203	17,017	36,972	65,099
Feb.	49,283	46,954	21,530	41,884	Aug.	48,971	20,649	38,601	59,227
Mar.	49,590	46,591	24,594	47,933	Sept.	47,025	20,415	36,948	54,905
Apr.	45,868	39,663	25,460	48,431	Oct.	52,132	23,158	37,282	54,155
May	44,278	38,690	29,822	76,393	Nov.	46,947	25,419	39,018	49,282
June	47,517	19,770	34,676	73,218	Dec.	45,795	25,341	38,269	

STOCKS IN OTHER CENTRES

End of: 1933	Malaya Mainland	Afloat for Europe	Holland	Colombo	Para and Manaos
Oct.	37,302	28,320	1,411	4,889	3,237
Nov.	36,965	38,530	1,285	5,575	3,383
Dec.	38,441	36,700	1,052	5,792	2,981
Jan., 1934	36,788	39,250	1,115	7,271	3,305
Feb.	39,630	36,563	906	5,366	3,420
Mar.	37,275	33,365	904	4,083	3,519
Apr.	33,765	32,640	905	4,070	3,624
May	7,213	39,370	897	3,066	3,556
June	20,243	36,870	902	3,533	3,273
July	27,235	35,430	1,263	4,683	3,094
August	30,507	36,060	1,322	5,713	2,849
Sept.	33,661	39,630	1,290	5,137	3,075
Oct.	31,762	40,000	1,401	5,675	3,113
Nov.	33,590	40,000	1,404	.....	3,081

Rims Inspected and Passed in U. S.

(Tire and Rim Association Reports)

	Total		Total		Total
1924	21,863,311	1928	24,247,282	1932	6,261,336
1925	26,001,664	1929	24,141,502	1933	8,713,962
1926	24,199,524	1930	17,364,096	1934	.....
1927	19,700,003	1931	11,253,800	1935	.....

1934:		1934:		1934:	
January	789,274	May	1,140,132	September	526,472
February	1,262,311	June	1,015,730	October	629,878
March	1,631,548	July	1,155,024	November	577,713
April	1,635,722	August	752,074	December	1,119,240

U. S. Tire and Tube Statistics[1]

(All Figures Represent Thousands)

AUTOMOBILE CASINGS

Figures for Recent Years

	1926	1927	1928	1929	1930	1931	1932	1933
Production	61,237	64,439	77,944	68,726	50,965	48,739	40,085	45,304
Shipments	59,002	64,059	74,296	69,395	53,638	48,151	40,260	44,094
Inventory[2]	10,456	10,264	13,624	11,838	9,003	7,775	7,644	8,888

Figures for Recent Months

	PRODUCTION 1932	1933	1934	SHIPMENTS 1932	1933	1934	INVENTORY 1932	1933	1934
Jan.	3,462	2,258	3,922	3,253	2,597	3,222	7,912	7,237	9,684
Feb.	3,871	2,339	4,335	2,553	2,292	3,285	9,172	7,377	10,725
Mar.	3,671	2,038	5,180	2,954	2,092	4,223	9,878	7,290	11,651
Apr.	3,517	3,123	4,470	3,698	3,654	4,438	9,846	6,778	11,981
May	3,820	5,189	4,456	4,258	5,180	5,332	9,379	6,760	11,127
June	5,643	6,100	4,342	10,065	6,305	5,228	4,999	6,615	10,219
July	3,617	5,714	3,353	2,404	5,497	4,157	6,203	6,844	9,437
Aug.	3,089	4,994	3,533	2,655	4,707	4,308	6,659	7,070	8,697
Sept.	2,539	3,999	2,936	3,082	3,503	3,183	6,096	7,595	8,419
Oct.	2,569	3,249	3,287	1,799	2,537	3,010	6,876	8,462	8,657
Nov.	2,304	3,039		1,711	2,197		7,454	9,247	
Dec.	1,983	3,082		1,819	3,531		7,644	8,888	

AUTOMOBILE INNER TUBES

Figures for Recent Years

	1926	1927	1928	1929	1930	1931	1932	1933
Production	76,618	70,823	80,180	68,829	52,420	48,333	36,891	42,546
Shipments	71,591	72,896	77,127	70,592	54,938	50,021	37,911	41,391
Inventory[2]	16,200	13,692	16,117	12,807	9,999	7,922	6,749	7,815

Figures for Recent Months

	PRODUCTION 1932	1933	1934	SHIPMENTS 1932	1933	1934	INVENTORY 1932	1933	1934
Jan.	3,308	2,093	3,530	3,529	2,535	3,199	7,719	6,197	8,403
Feb.	3,281	2,224	4,077	2,728	2,102	3,323	8,760	6,357	8,445
Mar.	3,502	1,883	5,194	2,686	1,902	4,118	9,448	6,369	10,244
Apr.	3,225	2,853	4,735	3,385	3,051	4,342	9,441	6,189	10,585
May	3,820	5,189	4,359	4,258	5,180	4,902	9,379	6,760	10,043
June	5,279	5,448	4,097	9,019	5,778	5,309	5,174	6,097	8,795
July	2,937	5,603	3,531	2,160	5,211	4,323	5,975	6,440	8,053
Aug.	2,748	4,916	3,680	2,503	4,687	4,198	6,127	6,628	7,555
Sept.	2,601	3,827	3,110	3,098	3,472	3,024	5,753	7,008	7,639
Oct.	2,187	3,506	3,219	1,658	2,676	2,689	6,214	7,831	8,151
Nov.	2,005	2,863		1,578	2,103		6,662	8,625	
Dec.	1,779	2,631		1,724	3,410		6,749	7,815	

(1) Rubber Manufacturers' Association figures, raised to 100%. The Association estimates its figures to be 75% complete up until 1929 and 80% complete for 1929-1933. Beginning 1934, the Association reported its figures to be 97% complete.

(2) Held by manufacturers at end of period indicated.

Automobile Production

	United States Total	Passenger Cars	Trucks	Canada Total	Passenger Cars	Trucks	Grand Total
1928	4,357,384	3,826,613	530,771	242,382	196,737	45,645	4,599,944
1929	5,358,420	4,587,400	771,020	263,295	207,498	55,797	5,621,715
1930	3,355,986	2,814,452	540,534	154,192	125,442	28,750	3,510,178
1931	2,389,730	1,973,090	416,640	82,621	63,477	19,144	2,472,351
1932	1,370,678	1,135,493	235,187	60,816	50,718	10,098	1,431,494
1933*	1,920,057	1,573,512	346,545	65,924	53,855	12,069	1,992,126
1933*							
Sept.*	191,800	157,376	34,424	5,808	4,358	1,450	197,608
Oct.*	134,683	104,870	29,813	3,682	2,723	959	138,365
Nov.*	60,683	42,365	18,318	2,291	1,503	788	62,974
Dec.*	80,563	50,789	29,776	3,262	2,171	1,091	83,827
1934							
Jan.*	156,907	113,652	43,255	6,904	4,946	1,958	153,811
Feb.*	231,707	187,666	44,041	8,571	7,101	1,470	240,278
Mar.*	331,263	274,738	56,625	14,180	12,272	1,908	345,443
Apr.*	354,745	289,031	65,714	18,363	15,451	2,912	373,108
May*	331,652	273,765	57,887	20,161	16,504	3,657	351,813
June*	308,065	261,852	46,213	13,905	10,810	3,095	321,970
July*	266,576	223,868	42,708	11,114	8,407	2,707	277,690
August*	234,810	183,500	51,310	9,904	7,325	2,579	244,714
Sept.*	168,871	123,909	44,962	5,579	4,211	1,368	174,450
Oct.*	132,491	84,503	47,988	3,780	2,125	1,655	136,271
Nov.	78,415	45,495	32,920	1,697	1,052	645	80,112

* Revised.

Exports of Crude Rubber from Principal Producing Countries

(*Long Tons*)

	BRITISH MALAYA [1]							DUTCH EAST INDIES [2]							
	Gross Exports	Imports	Gross Exports Minus Imports	Ceylon [3]	India & Burma [3]	Sarawak [4]	British North Borneo [3]	Siam [4]	Java & Madura	Sumatra E. Coast	Other D.E.I.	Indo-China [3]	Amazon Valley	All Other [5]	World Total [6]
1923	252,816	70,432	181,584	39,971	6,416	5,705	4,237	1,718	32,930	46,344	57,822	5,067	16,765	7,856	406,415
1924	259,706	108,524	151,182	39,997	7,657	6,699	4,621	2,962	42,446	54,497	80,347	6,688	23,165	9,065	429,366
1925	316,825	158,022	158,803	49,566	10,082	5,424	5,377	5,377	46,757	65,499	120,626	7,881	25,298	13,797	514,487
1926	391,328	151,243	240,085	58,962	9,874	9,155	6,079	4,027	52,186	71,413	121,231	8,203	24,298	16,017	621,530
1927	371,322	182,845	188,477	55,356	11,321	10,923	6,562	5,472	55,297	77,815	142,171	8,645	28,782	15,633	606,474
1928	409,430	149,787	259,643	57,267	10,790	10,087	6,698	4,813	58,848	82,511	121,770	9,548	21,129	10,690	653,794
1929	574,836	163,092	411,744	81,584	11,663	11,077	7,381	5,018	65,990	87,789	134,037	9,696	21,148	6,767	853,894
1930	547,043	133,876	413,167	76,970	10,782	10,309	6,781	4,251	69,755	79,396	115,254	7,665	14,260	5,651	814,241
1931	519,740	125,506	394,234	61,769	8,470	10,451	6,247	4,218	75,952	87,747	116,009	11,696	12,121	3,294	792,203
1932	478,252	92,539	385,713	48,973	3,888	6,960	4,664	3,451	61,312	79,837	85,871	13,883	6,450	1,816	702,818
1933:															
Jan.	46,599	7,857	38,742	4,602	318	590	458	305	4,766	5,630	6,840	1,957	554	125*	58,887
Feb.	37,564	6,167	31,397	5,064	304	541	458	368	4,895	5,119	6,081	895	620	125*	55,867
Mar.	42,059	7,964	34,095	4,905	389	571	458	304	5,092	6,466	6,999	1,102	995	125*	61,501
Apr.	36,752	7,758	28,994	4,582	272	624	583	235	5,226	5,969	8,147	1,122	556	125*	56,435
May	42,902	13,664	29,238	4,643	475	1,091	583	359	6,782	7,298	13,195	1,371	918	125*	66,078
June	41,411	16,538	24,873	5,198	377	1,149	582	632	7,352	6,654	14,779	1,369	704	125*	63,794
July	50,531	18,772	31,759	4,201	270	1,358	728	797	7,367	8,580	16,534	1,310	913	125*	73,942
Aug.	52,266	17,869	34,397	5,839	246	955	728	926	6,460	7,985	15,161	808	1,116	125*	74,746
Sept.	49,607	15,146	34,461	5,111	125	1,027	728	611	5,868	9,164	15,005	1,702	656	125*	74,453
Oct.	61,002	17,390	43,612	5,674	271	959	750	979	6,329	8,682	15,170	1,513	965	125*	84,879
Nov.	54,599	20,142	34,457	6,097	516	1,020	750	1,191	6,684	9,951	14,474	1,599	956	125*	77,820
Dec.	57,579	18,110	39,469	7,062	964	989	978	1,046	7,030	10,183	17,274	2,173	930	125*	88,223
1934:															
Jan.	55,055	21,184	33,871	7,551	1,531	1,197	805	1,290	6,513	8,974	17,718	2,158	576	125*	82,309
Feb.	57,867	19,688	38,179	8,354	775	1,005	805	1,264	6,706	10,277	17,466	1,100	831	125*	86,887
Mar.	58,515	26,470	32,045	6,954	1,412	1,360	806	1,363	8,655	12,043	25,064	1,316	846	125*	91,989
Apr.	56,748	27,963	28,785	5,783	762	1,447	894	1,311	7,282	11,324	24,054	1,519	440	125*	83,726
May	69,403	34,093	35,310	7,528	1,106	1,892	1,397	997	12,104	16,720	34,710	1,408	726	125*	114,023
June	53,282	20,981	32,301	3,305	1,425	1,886	644	1,497	4,860	6,078	15,216	1,504	765	125*	69,606
July	53,335	22,829	30,506	4,093	710	1,662	1,048	2,399	5,762	7,408	14,182	1,703	353	125*	69,951
Aug.	52,641	17,865	34,776	5,369	552	1,714	1,048	1,908	5,340	8,902	10,902	1,610	710	125*	72,956
Sept.	61,051	17,889	43,162	6,632	294	1,438	839	1,626	5,722	10,738	14,688	1,665	764	125*	87,693
Oct.	47,045	10,226	36,819	6,918	413	1,412	1,196	1,328	5,970	6,643	5,556	1,413	840	125*	68,633
Nov.	51,140	8,759	42,381	6,376	.....	953	941	1,356	7,621	7,123	5,338	2,356	1,017	125*	.....

(1) Malayan net exports cannot be taken as production, since imported rubber is largely wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 115 tons in 1923, 1,117 in 1924, 3,618 in 1925, 3,263 in 1926, 2,439 in 1927, 1,437 in 1928, 2,670 in 1929, and 1,274 in 1930. (2) Ceylon Chamber of Commerce statistics until 1926; rubber exported as latex is not included—such shipments were equivalent to 18 tons in 1923, 93 tons in 1924, 6 tons in 1925, 20 tons in 1926, about ½ ton in 1927, and 1 ton in 1928, and practically none in 1929, 1930 and 1931. (3) Official statistics. (4) Imports into Singapore and Penang. (5) Exports from "Other D.E.I." are chiefly wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 2,342 tons in 1923, 1,008 tons in 1924, 2,239 tons in 1925, 44 tons in 1926, 84 tons in 1927, 1,459 tons in 1928, 1,302 tons in 1929, and 2,656 tons in 1930. (6) Calculated from official import statistics of principal consuming countries, viz., United States, United Kingdom, France, Germany, Belgium and Netherlands, and includes guayule rubber. (7) This total includes the third column for British Malaya, "Gross Exports minus Imports," and all the figures shown for the other territories. * Figure is provisional; final figure will be shown when available.

Net Imports of Crude Rubber into Principal Manufacturing Countries

(*Long Tons*)

	United States [1]	United Kingdom	France (h)	Germany	Canada (ac)	Japan (da)	Italy	Russia (ce)	Australia (cd)	Belgium (d)	Netherlands	Scandinavia (abcdf)	Spain (g)	Czechoslovakia (abcd)	World Total
1919	238,407	42,671	17,685	5,584	6,395	9,753	9,894	75	1,002	3,995	2,771	3,149	2,418	9	343,808
1920	249,530	56,844	13,885	11,890	11,746	5,297	6,123	62	1,815	3,840	5,510	2,292	2,008	567	371,409
1921	179,736	42,087	15,135	21,920	8,124	21,713	3,906	165	1,014	1,705	1,022	1,279	2,245	569	300,620
1922	296,594	11,724	24,352	27,546	9,207	15,934	6,430	2,493	2,643	172	—3,807	1,778	589	567	396,222
1923	301,527	12,700	27,392	18,519	13,277	15,372	8,489	2,986	1,649	2,184	792	2,528	630	1,128	409,173
1924	319,103	—11,550	30,446	22,727	14,299	19,571	8,764	2,346	3,124	2,688	—807	3,178	944	1,370	416,203
1925	385,596	4,061	32,956	33,937	19,683	11,117	11,412	7,088	4,757	2,930	875	3,149	1,155	1,558	520,274
1926	399,981	84,865	34,240	22,773	20,229	18,125	9,809	6,529	9,021	2,498	2,670	4,046	1,299	1,870	617,957
1927	403,472	60,249	34,271	38,892	26,405	20,521	11,381	12,018	9,490	6,482	636	4,224	2,055	2,672	632,768
1928	407,572	4,846	36,49b	37,855	30,447	25,621	12,433	15,134	8,430	7,958	2,243	4,418	3,178	3,138	599,771
1929	528,608	122,675	55,093	49,275	35,453	34,284	17,169	11,774	15,886	9,445	3,022	6,440	864	4,650	894,638
1930	458,036	120,069	68,503	45,488	28,793	33,039	18,639	16,387	5,354	10,635	2,924	7,710	2,400	4,468	822,445
1931	475,993	86,170	46,466	39,688	25,261	43,483	10,149	30,671	7,649	11,009	2,220	6,360	2,605	7,717	794,641
1932	393,844	44,086	42,506	45,121	20,917	56,027	14,469	30,637	12,576	9,519	2,851	7,262	4,359	9,444	693,618
1933	398,365	73,335	61,953	54,120	19,332	66,831	19,341	29,830	13,534	11,166	1,245	7,831	5,520	10,402	.....
1933:															
July	43,824	3,961	3,774	4,103	1,192	1,460	1,146	2,952	2,347	299	16	486	435	287	66,281
Aug.	43,208	4,330	5,251	4,193	1,795	4,424	1,249	3,312	1,500	325	209	616	606	2,759	73,779
Sept.	43,886	4,341	4,111	5,841	2,620	5,369	2,055	2,168	794	864	189	604	790	577	74,211
Oct.	43,366	3,373	4,921	4,772	2,580	6,150	1,836	2,084	604	1,118	310	777	441	686	73,081
Nov.	39,633	3,955	5,419	4,086	2,184	6,296	942	4,483	301	1,129	222	878	493	882	70,903
Dec.	38,864	6,524	5,415	4,933	1,773	6,865	1,029	2,400	190	1,360	213	703	776	1,772	72,817
1934:															
Jan.	47,114	9,503	6,472	6,057	1,721	5,628	2,517	2,749	566	2,173	381	1,185	484	1,355	88,276
Feb.	33,087	10,785	5,301	5,490	1,854	4,570	2,388	3,399	950	1,538	287	464	656	516	73,357
Mar.	39,306	14,008	4,980	6,453	3,411	5,655	1,394	4,018	671	965	284	836	394	976	86,242
Apr.	42,262	9,999	3,210	6,701	2,419	5,679	1,966	1,326	415	504	262	1,217	752	465	77,177
May	47,412	9,786	3,634	6,499	2,218	6,905	2,218	4,360	769	214	322	940	140	1,768	87,192
June	46,785	16,564	3,803	6,171	2,208	6,745	1,887	3,145	1,512	837	331	843	1,146	1,624	93,601
July	40,308	12,266	4,051	5,494	2,430	5,739	708	1,640	732	810	540	1,602	747	1,094	78,161
Aug.	31,405	13,728	3,660	3,078	1,948	4,945	1,795	6,829	658	669	239	1,033	277	1,495	71,759
Sept.	30,345	11,254	4,244	2,607	2,770	7,346	1,486		743	501	339	980	465	477	
Oct.	27,323	18,897	3,424	2,148	3,043	7,227	1,296		798	693	447	813	675	254	
Nov.	35,982	15,875							516		187				

a—Including gutta percha. b—Including balata. c—Re-exports not deducted in monthly statistics. d—Including some scrap and reclaimed rubber. e—Official statistics of rubber imports by Soviet Russia. f—Including Norway, Sweden, Denmark and Finland. g—United Kingdom and French exports to Spain except in years prior to 1925. h—French imports have been reduced 12 per cent in order to eliminate imports of gutta percha and to reduce to basis of net weight. [1] United States imports of guayule are included in this compilation. * Figure is provisional; final figure will be shown immediately it becomes available.

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